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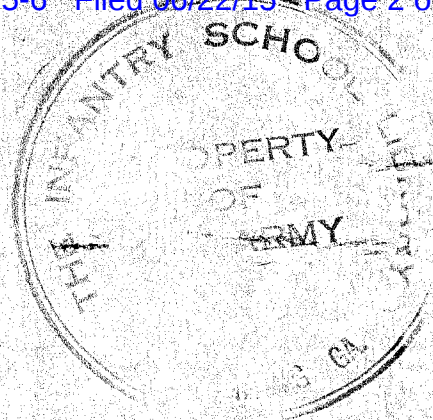
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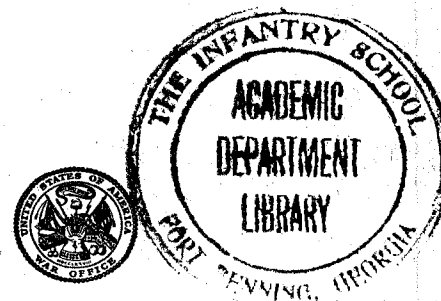
WAR DEPARTMENT BASIC FIELD MANUAL

FM 23-75

F.B.

This manual supersedes FM 23-75, 57-mm Gun, Antitank, M1 (tentative).

57-MM GUN, M1



WAR DEPARTMENT • 15 JUNE, 1944

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WAR DEPARTMENT,

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FM 23-75, 57-mm Gun M1, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

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Major General,
The Adjutant General.

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IR 7: T/O & E 7-11, Inf Regt;
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Co, Armd Inf Bn; 7-98, Hq Co, Inf Bn, Sep(5); 7-19, Inf Anti-
tank Co, 57-mm Gun (15);
IC 17: T/O & E 17-2, Hq Co, Armd Div.

For explanation of symbols, see FM 21-6.

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This manual supersedes FM 23-75, 57-mm Gun, Antitank, M1 (tentative). (Attention is directed to FM 21-7, for details as to how appropriate training films and film strips are intended to be used, and how they are made available for use during training with the 57-mm gun, M1.)

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CHAPTER 1

INTRODUCTION

1. PURPOSE AND SCOPE. a. This manual provides the unit commander with the data necessary for the step-by-step training of antitank units in the elements of antitank gunnery, as executed with the 57-mm gun M1.

b. Pertinent material which is presented adequately in other manuals is omitted from this text to avoid duplication. Appropriate references to other manuals are made at the point where such material is omitted.

c. The instructor can prepare a progressive training plan by following the continuity of the text. Suggestions on the organization of the work and the presentation of each step of training are provided in chapter 8.

NOTE. For military terms not defined in this manual, see TM 20-205.

CHAPTER 2

MECHANICAL TRAINING

Section I. GENERAL

2. DESCRIPTION. The 57-mm gun M1, is a flat trajectory weapon of the field gun type with a semi-automatic drop-type breechblock. It fires a projectile which weighs approximately 6 pounds. The gun is mounted on a carriage of the split-trail type, equipped with pneumatic tires. It is designed for one-man control of aiming, elevating, depressing, traversing and firing. When the trails are closed and locked, the gun can be towed by the prime mover on roads and across country.

3. GENERAL DATA AND DETAILED DESCRIPTION. See TM 9-303.

Section II. DISASSEMBLY AND ASSEMBLY

4. REFERENCE. TM 9-303 contains complete instructions on disassembly and assembly of the 57-mm gun M1.

5. LIMITATIONS ON USING ARMS. The using arms, for the purpose of maintaining, cleaning, adjusting, and repairing the gun, are permitted to remove and disassemble in detail the following groups only:

- a. Striker (firing) case assembly.
- b. Breechblock.
- c. Barrel and slipper (sleigh).
- d. Firing gear linkage from the gun carriage.

Section III. MEECHANICAL FUNCTIONING

6. REFERENCE. See TM 9-303.

7. PHASES OF FUNCTIONING. Instruction in functioning is divided and presented in five phases, as follows:

- a. Opening the breech.
- b. Closing the breech.
- c. Firing the piece.
- d. Recoil and counterrecoil.
- e. Safety features of the firing mechanisms.

8. OPENING THE BREECH. The sequence of this instruction is as follows:

- a. By hand.
 - (1) Retraction of the firing pin.
 - (2) Lowering the breechlock.
 - (3) Cocking.
 - (4) Extraction.
 - (5) Compression of the breechlock closing spring.
 - (6) Retaining the breechlock in the lower position.
- b. By action of the semiautomatic gear mechanism.

9. CLOSING THE BREECH. The sequence of this instruction is as follows:

- a. Releasing the breechblock.
- b. Raising the breechblock.
- c. Forcing the round into the chamber.
- d. Return of the firing pin cocking link to the firing position.

10. FIRING THE PIECE. The sequence of this instruction is as follows:

- a. Operation of the firing gear linkage.
- b. Operation of the striker (firing) case assembly.

11. RECOIL AND COUNTERRECOIL. See TM 9-303.

12. SAFETY FEATURES OF FIRING MECHANISM. The sequence of instruction on this subject is as follows:

a. The safety catch.

b. The safety features designed to prevent premature firing. The piece will not fire unless the breechblock is fully raised, for the following reasons:

(1) The flange on the firing lever does not coincide with its slot in the breechblock until the breechblock is fully raised.

(2) The firing pin cocking link projects beyond the rear face of the breechblock until the breech is fully closed, and thus prevents the cocking sleeve and firing pin from going completely forward.

(3) The firing pin is not lined up with the primer of the cartridge until the breechblock is fully raised.

Section IV. STOPPAGES AND IMMEDIATE ACTION

13. DEFINITIONS. a. A stoppage is the accidental stopping of fire.

b. Immediate action is the unhesitating application of a probable remedy to reduce a stoppage.

14. STOPPAGES. a. **Prevention of stoppages.** The number of stoppages can be reduced to the minimum if the gun crew has a practical working knowledge of the weapon and applies proper care before, during, and after firing.

b. **Causes of stoppages.** (1) A stoppage will occur if the gun fails to fire or if the breech fails to open or close completely.

TABLES OF STOPPAGES.

Table I. Failure to fire.

Cause	Probable remedy
(1) Safety catch set on SAFE.	(1) Rotate safety catch to FIRE position.
(2) Defective ammunition.	(2) Apply immediate action.
(3) Defective firing mechanism.	(3) Replace firing case.
(4) Gun not in battery.	(4) Apply immediate action.
(a) Adjusting valve incorrectly set.	(a) Adjust valve.*
(b) Expansion of recoil oil.	(b) Withdraw a little oil through air plug.
(c) Burs or dirt on liners.	(c) Remove dirt or burs—lubricate.
(d) Weak or broken counterrecoil springs.	(d) Notify ordnance personnel.
(e) Packing too tight.	(e) Slacken packing gland.*

Table II. Failure of breech to close.

Cause	Probable remedy
(1) Extractors not released.	(1) Reload with sufficient force to release extractors.
(2) Dirt or obstruction on breechblock or in chamber.	(2) Clean and lubricate.
(3) Gun not in battery.	(3) See table I, remedy (4) above.
(4) Breechblock closing spring broken.	(4) Notify ordnance personnel.
(5) Lack of lubrication of breechblock bearing surfaces.	(5) Remove, clean, and lubricate breechblock; clean and lubricate breechring.

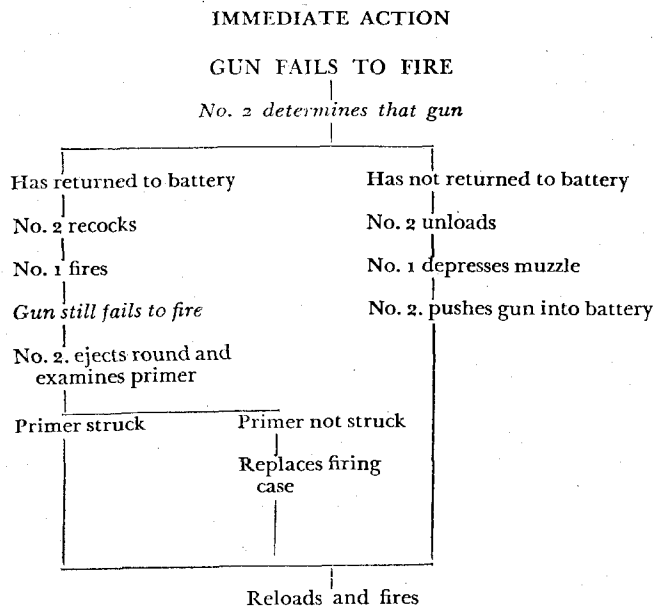
Table III. Failure of breech to open.

Cause	Probable remedy
(1) Shifting cam lever not set at SA.	(1) Move lever to SA.
(2) Semiautomatic gear inoperative.	(2) Notify ordnance personnel, operate by hand.
(3) Gun not in battery.	(3) See table I, remedy (4).

*Except in case of emergency, this remedy should be applied by skilled ordnance personnel. For adjustment of counterrecoil, see TM 9-808.

(2) TM 9-303 contains a complete and detailed list of stoppages. However, the tables below list those stoppages most likely to be encountered, with the probable remedy for each stoppage.

15. IMMEDIATE ACTION. The procedure to be followed for the prompt reduction of the usual stoppages is given in the table below. It consists of a positive and automatic manual operation unhesitatingly applied without detailed consideration of the cause.



NOTE. Immediate action must be applied in time to cause the ejected round to leave the chamber not longer than 45 seconds from the original attempt to fire. If gun cannot be pushed into battery, the cause must be analyzed and the remedy applied as given in the Tables of Stoppages. (See par. 14.)

Section V. CARE AND PRESERVATION

16. REFERENCE. See TM 9-303.

17. SEQUENCE OF INSTRUCTION. The following subjects should be included in instruction on this phase of mechanical training:

- a. Care and cleaning.
- b. Lubrication.
- c. Filling the recoil mechanism.
- d. Adjustment of recoil mechanism.
- e. Inspections before, during, and after firing.
- f. Special precautions during unusual conditions.

18. CARE WHEN SUBJECT TO GAS ATTACK. a. General.

(1) It is important to prevent chemicals used in a gas attack from coming in contact with the gun, ammunition, and accessories. When a gas attack is anticipated, the following action will be taken: apply oil to all outer surfaces of the gun and accessories. If the gun is not to be used, cover gun, accessories, and ammunition. Do not apply oil to ammunition.

(2) After the attack, determine by means of detector crayon or paper whether or not the matériel is contaminated. If uncontaminated, clean matériel with dry-cleaning solvent.

b. Decontamination. If contaminated, the following action will be taken:

(1) Protective clothing and a service gas mask must be worn by personnel engaged in decontamination.

(2) Matériel contaminated with chemicals other than mustard or lewisite must be cleaned as soon as possible with dry-cleaning solvent or denatured alcohol.

(3) Do not allow the chemical agents to come into contact with the skin. Burn or bury all rags or wiping

materials used for decontamination. *Extreme caution should be taken to protect men against fumes created by burning.*

(4) If the surface of the matériel is coated with grease or oil and has been in a mustard or lewisite attack, remove the grease or oil by wiping with rags wet with dry-cleaning solvent.

(5) Decontaminate the gun with a solution of noncorrosive decontaminating agent. Prepare this by mixing one part of noncorrosive decontaminating agent with 15 parts of solvent (acetylene tetrachloride) by weight, or by mixing one part of noncorrosive decontaminating agent with 6 parts of solvent by volume.

(6) After decontamination, clean the matériel thoroughly.

c. References. Detailed information on decontamination is contained in FM 21-40, TM 9-850, and 3-220.

Section VI. DESTRUCTION OF ORDNANCE MATERIEL

19. DESTRUCTION OF ORDNANCE MATERIEL IN EVENT OF IMMINENT CAPTURE IN COMBAT ZONE. **a. General.**

The decision to destroy ordnance matériel to prevent its capture and use by the enemy is a command decision and will be ordered and carried out only on authority delegated by the division or higher commander.

b. Principles governing destruction. The following are the fundamental principles to be observed in the execution of an order to destroy equipment:

(1) The destruction must be as complete as the circumstances will permit.

(2) Lacking time for complete destruction, the parts essential to operation of the weapon must be

destroyed, beginning with those parts most difficult of duplication by the enemy.

(3) *The same essential parts of each weapon must be destroyed to prevent the reconstruction of a complete weapon from several damaged ones.*

c. Training. The training of individuals before they reach the combat zone will be such as to insure their ability to destroy quickly and adequately the organic weapons in an established and uniform sequence based on the principles stated in b above. Training will not involve the actual destruction of matériel.

20. METHODS. **a. Destruction of 57-mm gun M1 (tube, breech, and recoil mechanism).**

(1) *Sighting equipment.* Detach all sighting equipment. If evacuation is possible, carry it; if evacuation is not possible, thoroughly smash the equipment.

(2) *Method No. 1* (a) Open filling hole plug and air plug on recoil mechanism, allowing recoil fluid to drain. *It is not necessary to wait for the recoil fluid to drain completely before firing in (d) below.*

(b) Place an armed (safety pin removed) antitank rifle grenade M9A1 in the tube about 6 inches in front of and with the nose (ogive) toward, the AP shell in (c) below.

(c) Insert an AP round into the gun and close the breech.

(d) Use a lanyard at least 100 feet long. The person firing should be under cover to the rear of the piece and approximately 20 degrees off the line of fire. Elapsed time: Approximately 2 to 3 minutes.

(e) The danger zone is approximately 200 yards.

(3) *Method No. 2.* Insert 1/2-pound TNT blocks, cap, and fuze in the bore near the muzzle and in the chamber of the gun. Close the breechblock as far as possible without damaging the safety fuze. Plug the muzzle tightly with earth to a distance of approximately 7 inches from the muzzle. Detonate the TNT

charges simultaneously. The number of 1/2-pound TNT blocks needed for effective demolition is two to three (with cardboard cases removed) in the bore, and four to six in the chamber. If it is not possible to plug the bore, a larger number of TNT blocks will be needed for effective demolition.

b. Destruction of 57-mm gun carriages, M1, M1A1, M1A2, and M1A3. (1) *General.* Whenever possible, artillery carriage destruction should be accomplished in conjunction with the demolition of the tube, breech, and recoil mechanism. When this cannot be done, destruction of the tube, breech, and recoil mechanism will have priority.

(2) *Method No. 1* (a) Place six 1/2-pound TNT blocks on the top carriage below the cradle in the vicinity of the pintle. Detonate TNT charges simultaneously, using detonating cord, tetryl nonelectric caps, and at least 5 feet of safety fuze. Elapsed time by this method is 5 to 10 minutes. The minimum danger zone is 200 yards.

(b) This method of demolition may be combined with destruction of the tube, breech, and recoil mechanism, by simultaneous detonation.

(3) *Method No. 2.* (a) With one 57-mm gun, fire at other guns at point-blank range using AP shells. A great number of hits will be necessary to destroy the carriages. Fire from cover. Danger space is from 200 to 500 yards.

(b) Destroy the last gun and carriage by the best means available.

(c) The possibility of enemy personnel salvaging undamaged parts of several guns and combining these parts into a serviceable weapon is greater in this method than in other methods.

c. Destruction of pneumatic tires. (1) *General.* (a) Rubber is such a critical item that, whenever matériel is subject to capture or abandonment, an attempt to destroy pneumatic tires always must be made, *even if*

time will not permit destruction of the remainder of the carriage.

(b) With adequate planning and training, however, the destruction of tires may be accomplished in conjunction with destruction of the weapon without increasing the time necessary.

(2) *Method No. 1.* (a) Ignite an M14 incendiary grenade under each tire.

(b) To insure the best results, when this method is combined with the destruction by TNT of 57-mm carriages, M1, M1A1, M1A2, and M1A3, be certain that the incendiary fires are started well before detonation of the TNT.

(3) *Method No. 2.* Damage the tires with an ax, pick, or heavy machine-gun fire (deflate them before doing this, if possible). Pour spare gasoline on tires, dousing each one, and ignite.

d. Destruction of ammunition. (1) *General.* (a) When sufficient time and materials are available, ammunition may be destroyed as indicated below. At least 30 to 60 minutes will be required to destroy the ammunition carried by combat units.

(b) In general, the methods and safety precautions outlined in chapter 4, TM 9-1900, will be followed.

(2) *Unpacked, complete round, ammunition.* Stack ammunition in small piles. Stack or pile most of the available gasoline in cans and drums around the ammunition. Throw onto the pile all available inflammable material such as rags, scrap wood, and brush. Pour the remaining available gasoline over the pile. Sufficient inflammable material must be used to insure a very hot fire. Ignite the gasoline and take cover.

(3) *Packed, complete round, ammunition.* Stack the boxed or bundled ammunition in small piles. Cover with all available inflammable materials, such as rags, scrap wood, brush and gasoline in drums or cans. Pour gasoline over the pile. Ignite the gasoline and take cover.

**Section VII. SPARE PARTS, EQUIPMENT,
AND ACCESSORIES**

21. EQUIPMENT, SUBCALIBER, CALIBER .22-.30. Sub-caliber equipment for the 57-mm gun, M1, consists of—
Subcaliber mount, caliber .22-.30, M6, with extension and bushings for 57-mm gun and firing attachments.

U.S., Rifle, subcaliber, caliber .22, M2A1.

U.S., Rifle, subcaliber, caliber .30, M1903A2.

Necessary spare parts and accessories are listed under articles for instructional purposes in the organizational spare parts and equipment section of SNL C-36.

a. Description of subcaliber mount (fig. 1). The sub-caliber mount consists of a long tube, which extends the full length of the 57-mm gun barrel, a breech housing which fits into the rear bushing for the mount, and a receiver locking frame which will receive either the caliber .30 or caliber .22 subcaliber rifles. The mount is retained in place in the barrel of the gun by means of a nut which screws on the tube of the subcaliber mount and bears against the muzzle bushing which in turn bears against the muzzle of the gun.

b. To install subcaliber mount. (1) Open breech. Slide the breech bushing and coupler spacer onto the subcaliber mount tube. Using the coupler, couple the extension to the tube. Insert the assembled tube in the barrel of the 57-mm gun. Push breech housing into the breech with the trigger trip to the left. Place the leather washer, muzzle bushing and muzzle spacer over the protruding end of the tube. Screw the muzzle locking nut onto the threaded end of the tube in order to lock the mount in place. The subcaliber mount is equipped with a flexible steel cable for actuating the trigger of the caliber .22 or caliber .30 rifle which is positioned in the mount. The cable head

is machined to fit the 37-mm gun. Until the mount is modified, it will be necessary to improvise a means of actuating the subcaliber rifle. The following method is suggested:

(2) Secure a piece of $\frac{3}{16}$ -inch stiff metal rod, long enough to connect the trigger trip on the receiver locking frame of the subcaliber mount to an improvised clamp on the rear end of the connecting rod. The clamp must be attached to the connecting rod, just in front of the rear turnbuckle, and must provide a linkage for the stiff metal rod. When hooked at the ends, this metal rod will firmly connect the trigger trip and connecting rod. This device will enable the gunner to fire by pulling the trip lever to the rear in the normal manner.

c. To install subcaliber rifles in subcaliber mount. To install either the caliber .30 or caliber .22 sub-caliber rifle in the subcaliber mount, remove floor plate, magazine spring, and follower from the rifle. Remove front and rear trigger guard screws. Insert rifle muzzle with rifle bushing in subcaliber mount breech housing, until rifle is completely seated, with bolt up. Insert trigger guard assembly in receiver locking frame. Swing receiver locking frame into its raised position. Replace front and rear trigger guard screws. Replace floor plate, magazine, spring, and follower. Check to make sure that trigger trip of subcaliber mount is ahead of rifle trigger.

NOTE. Always check to see that the brass rifle bushing is on the muzzle of the rifle before inserting the rifle in the subcaliber mount tube. Only one of these bushings is issued with the equipment; it fits both the caliber .30 and caliber .22 rifles. Whenever the caliber of the firing is changed, it is necessary to change the bushing from one rifle to the other. To remove, withdraw the pin holding the bushing to the front sight of rifle and tap the rear of the bushing gently with a drift.

d. To remove subcaliber rifles from subcaliber mount. Remove floor plate, magazine spring, and follower. Remove front and rear trigger guard screws. Remove trigger guard. Swing receiver locking frame downward

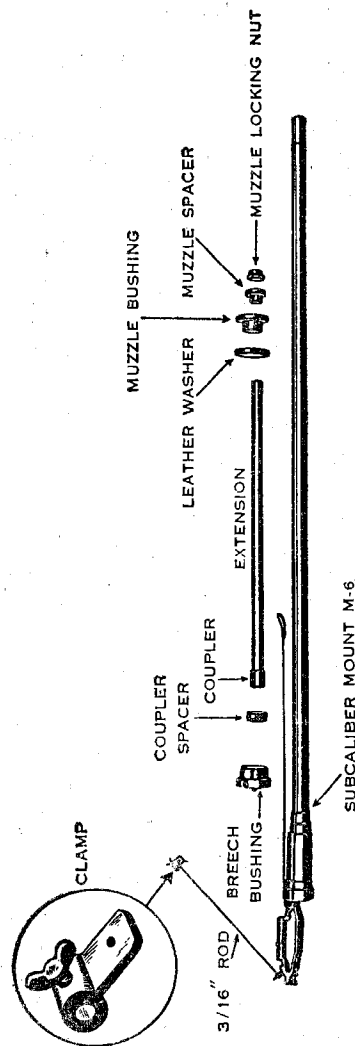


Figure 1. Subcaliber mount and firing attachments for 57-mm gun.

until rifle trigger is cleared. Remove subcaliber rifle to the rear.

22. ADDITIONAL EQUIPMENT. For information on other equipment, including artillery gun book, see TM 9-303. The individual towing equipment used with the 57-mm gun M1, is the "rope, drag, with shoulder strap, M1918," and is referred to throughout this manual as the drag rope.

CHAPTER 3

PREPARATORY GUNNERY

Section I. GENERAL

23. PURPOSE AND SCOPE. The training outlined in this chapter and in chapter 4 is designed to make the gun squad proficient in servicing, laying, and firing the gun at either stationary or moving targets and to prepare the squad for the firing of subcaliber and service ammunition. Training subjects are presented progressively in order to provide a cumulative instruction plan and to insure thoroughness in training individuals and squads.

24. TRAINING PRINCIPLES. Assign a squad permanently to each gun and train it as a team. The initial training objective is to make each man a trained gun commander and gunner and to teach him to perform the duties of every other member of the squad. This is accomplished by assigning each man a squad position and rotating him through the duties of the other positions within the squad, as training progresses. Good gunnery habits are acquired only through the maintenance of strict training discipline. This discipline is maintained by preserving each squad intact under the control of its regularly assigned leader. Such a method develops a competitive spirit between squads and a sense of responsibility in the squad leaders. Each step in training should be critiqued in order to emphasize important doctrine and to correct errors. Before progressing to subsequent steps in training the instructor

must determine by short examinations that each man is proficient in the training already covered.

Section II. CARE, USE, AND ADJUSTMENT OF FIRE CONTROL EQUIPMENT

25. SIGHTING EQUIPMENT. **a. Telescopes, M18, and M69C.** See TM 9-303 for description, mechanical use, care and preservation, and boresighting.

b. Telescope mounts, M24, M24A1, and M63, and instrument light, M33. See TM 9-303 for description, mechanical use, care and preservation, and boresighting.

c. Off carriage fire control instruments. For mechanical and technical data concerning binoculars, compass, and aiming post, see TM 9-575.

Section III. CREW DRILL — GENERAL

26. PURPOSE AND SCOPE. **a.** The purpose of training in crew drill is to develop in the squad precision, teamwork, and speed in placing the gun in action, taking it out of action, serving it during firing, and continuing it in action with a reduced squad. This training consists of two phases, elementary and advanced. Elementary crew drill is training initially without and later with the prime mover. Advanced crew drill is the application of elementary crew drill to field conditions and should not be given until each member of the squad is proficient in elementary training.

b. Precision is acquired by performing each operation and making each move in proper sequence with exactness and in accordance with prescribed procedure.

c. Teamwork is attained when each member of the squad can perform his duties and thoroughly understands their relation to and effect upon the duties to be performed by the other squad members.

d. Speed is developed through practice, during which each member of the squad learns to perform each operation automatically. Development of speed is stressed as training progresses.

e. Continuing the gun in action with a reduced squad is assured by training each member of the squad in the duties of the other members, particularly in the duties of the squad leader and No. 1. This is accomplished by rotating the members during drill.

27. GENERAL RULES. a. Drill will be executed and commands and signals given as described in FM 22-5. Particular attention should be given to drill for motor units, extended order, and signals. In executing the drills described herein, the individual soldier will, as far as practicable, conduct himself in accordance with those provisions of FM 22-5 pertaining to the soldier without arms and the soldier with arms.

b. Except when forming the squad at the command FALL IN, all training is executed at ease.

c. All movements in assuming position, other than the movement of the gun by hand, will be executed at a run. Speed of execution should be developed gradually as individual and squad proficiency is attained.

d. The position of the squad leader, unless prescribed otherwise, will be that from which he can best supervise and direct training.

e. The drag rope will be worn in the slung position for all training, except when actually used for towing the gun. Nos. 1, 3, and 5 will adjust the breast strap over the right shoulder and across the chest to the left hip; Nos. 2, 4, and 6 over the left shoulder and across the chest to the right hip. The rope will be passed across the front of the body, then com-

pletely around the back of the body and the hook engaged in front of the body in the ring of the breast strap. (See fig. 2.)

f. Whenever the gun is being moved by hand and the command HALT is given, the trails of the gun carriage will be lowered to the ground.

g. Training of the squad will include periods of drill while wearing the gas mask.

28. DEFINITIONS AND TERMS. a. **Coupled.** A gun is coupled when the lunette is attached to the pintle of the prime mover.

b. **Uncoupled.** A gun is uncoupled when the lunette is detached from the pintle of the prime mover.

c. **Front.** Front, with the gun coupled, is the direction in which the prime mover is headed; with the gun uncoupled, it is the direction in which the muzzle of the gun points.

d. **Right (left).** The direction right (left) is the right (left) of one facing to the front.

e. **Readiness for action.** Being uncoupled, the gun may be held in one of two stages of readiness for action:

(1) *In firing position.* The gun is prepared to fire instantly.

(2) *In cover position.* The gun is near a reconnoitered and prepared firing position. The gun is prepared for firing as far as practicable in the tactical situation and held under cover.

29. ORGANIZATION AND EQUIPMENT (fig. 2). a. The 57-mm gun squad is organized as follows:

- (1) Squad leader.
- (2) Gunner, No. 1.
- (3) Cannoneer (loader), No. 2.
- (4) Cannoneer, No. 3.
- (5) Cannoneer, No. 4.
- (6) Cannoneer, No. 5.
- (7) Ammunition bearer, No. 6.

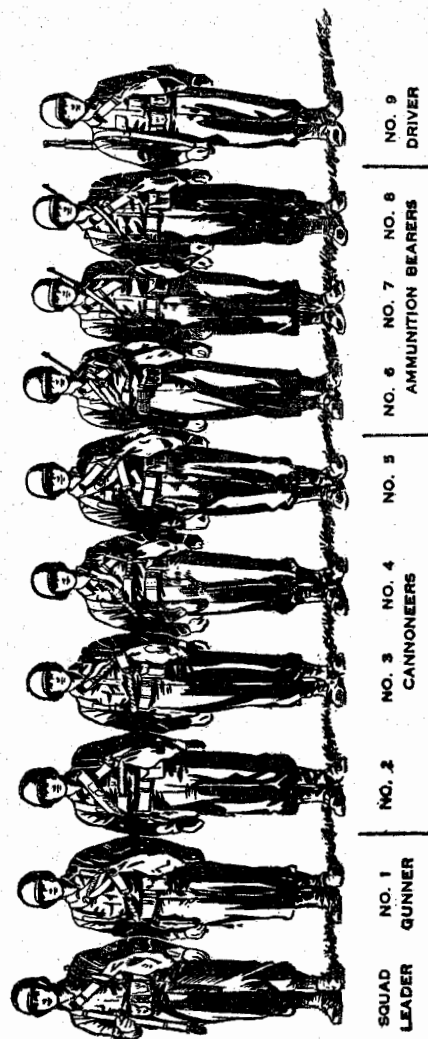


Figure 2. Organization of 57-mm gun squad.

- (8) Ammunition bearer, No. 7.
- (9) Ammunition bearer, No. 8.
- (10) Truck driver, No. 9.

b. Each member of the squad is given a number as indicated above. If the truck driver is present for training without his vehicle, he is designated as No. 9 and functions as an additional ammunition bearer.

c. For equipment of the gun squad, see Table of Organization and Equipment.

30. DUTIES. a. Squad leader (observer). The squad leader (observer) is in direct command of the gun and its equipment, including the prime mover, when present. He conducts the squad in accordance with the orders or instructions of his platoon leader or of the commander of the unit to which he is attached. He is responsible for the care and maintenance of the gun and its equipment. In combat, he is responsible for the accomplishment of the squad's mission. He controls and conducts the fire of the gun and is responsible for its proper concealment. He keeps the platoon leader informed of the status of ammunition supply.

b. **Gunner, No. 1.** The gunner lays and fires the gun and acts as squad leader in the latter's absence. He is careful to coordinate his actions with No. 2.

c. **Cannoneer, No. 2.** No. 2 loads the gun and coordinates his movements and duties at the gun with No. 1.

d. **Cannoneer, No. 3.** No. 3 hands ammunition to No. 2 to facilitate loading.

e. **Cannoneer, No. 4.** No. 4 delivers ammunition to the close proximity of No. 3. He swabs out the bore at the direction of the squad leader. He may be used as an air-antitank guard.

f. **Cannoneer, No. 5.** No. 5 assists No. 4 in preparing ammunition and may be used as an air-antitank guard.

g. **Nos. 6, 7, and 8.** Nos. 6, 7, and 8 are ammunition bearers.

h. **Truck driver No. 9.** The truck driver is responsible for driver maintenance of his prime mover and for its concealment and camouflage when halted. When not engaged in his duties as driver, he performs the duties of ammunition bearer.

Section IV. ELEMENTARY CREW DRILL WITHOUT PRIME MOVER

31. EQUIPMENT. For training without the prime mover, the articles of equipment carried may be modified to meet the actual needs of the training being conducted; except that the drag rope will be worn. One 57-mm gun, complete, with dummy ammunition, will be used.

32. TO SECURE EQUIPMENT. For training without the prime mover, the squad normally will be formed, and arms will be inspected as a part of a larger unit (platoon). Under direction of the squad leader, matériel will be inspected and the individual members of the squad will secure the equipment necessary for the particular training to be conducted. Gun covers will be removed.

33. TO FORM THE SQUAD (fig. 3). **a.** Equipment having been secured and the gun having been moved to the location designated by the squad leader, the squad forms as follows: the squad leader places himself to the left, and 3 paces in rear of the trail spades, facing the front, so that, when the squad forms, its center will be aligned with the spades. He then commands: **FALL IN.** The squad forms on the right of the squad leader in four ranks at close interval. The two men in the front rank align themselves on the right of

the squad leader. The men in the succeeding ranks cover off the two men in the front rank.

b. To form the squad in any other location or facing in any other direction than that prescribed in a above, the squad leader places himself at that location or faces the described direction and prefaces the command **FALL IN** with an indication of the assembly point; as, "In front of gun," "In front of truck." When the command is given, the members of the squad form on the squad leader as described in a above.

c. If the members of the squad have been assigned numbers previously, each will take position in his appropriate place, at the command **FALL IN.**

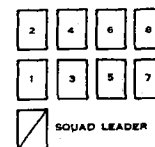
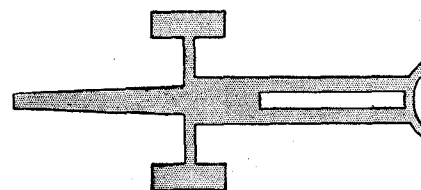
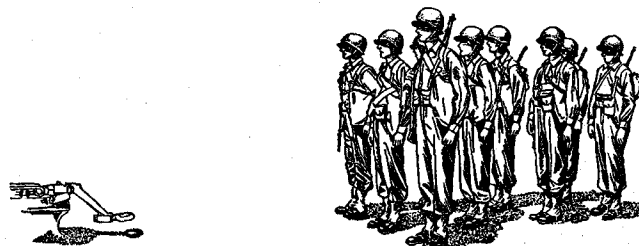


Figure 3. Fall in. (Driver is with prime mover.)

34. TO CALL OFF. *a.* The command is: CALL OFF. in the FALL IN positions, the man on the right of the squad leader calls, "One;" the man on the right of No. 1, "Two;" the man in the rear of No. 1, "Three;" the man on the right of No. 3, "Four;" continuing in this manner until each member of the squad has called his number.

b. Once having called off, if a subsequent formation is ordered, the men fall in their proper order.

35. INSPECTION OF ARMS. When the squad is first formed for any drill or exercise, and it has not been inspected as part of a larger unit, arms will be inspected immediately after the execution of the command CALL OFF.

36. TO TAKE POSTS AT THE GUN (fig. 4). *a.* The command is: POSTS. The members of the squad move to their posts. No. 1 places himself in rear of the left wheel and alongside the trail; No. 2 in rear of the right wheel and alongside the trail; Nos. 3 and 4 alongside the left and right spades, respectively; Nos. 5 and 6 move up behind Nos. 3 and 4, respectively; all face to the front. Nos. 7 and 8 remain at their FALL IN positions, at ease.

b. For preliminary instruction, the squad is formed as described in paragraph 33 and the command posts is given from that formation. However, the command posts may be used whether the members of the gun squad are in or out of ranks.

37. TO CHANGE NUMBERS AND DUTIES IN THE SQUAD.

a. The squad being in any formation, the command is: FALL OUT ONE (TWO, THREE) (or any other number of the squad). When a number is directed to fall out, he takes the position of the last number of the squad. For example, when No. 1 falls out, he moves to the position of No. 8, No. 2 moves to the position of No. 1. No. 3 moves to the position

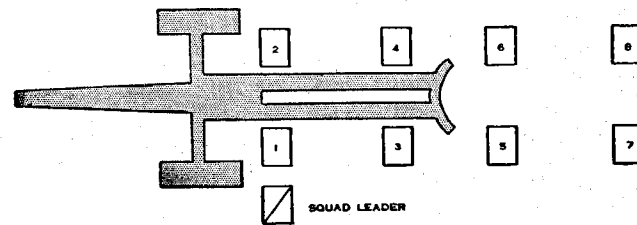
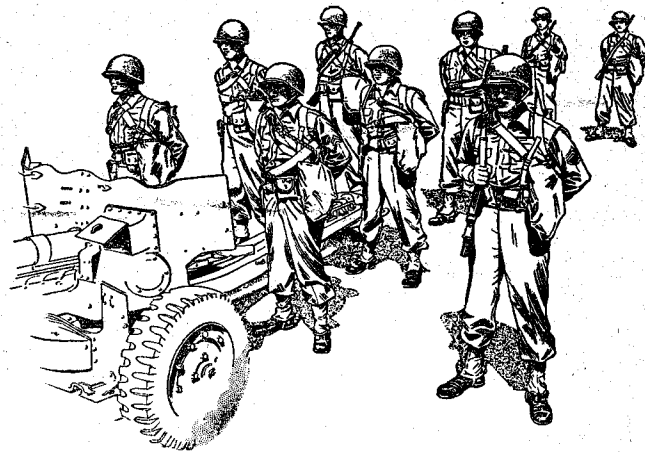


Figure 4. Posts of gun squad. (Driver is with prime mover.)

of No. 2, and in this manner throughout the squad each man moves up one number. The numbers, following the designated number, move to their new positions. The men having lower numbers than the designated number do not change their positions. At the end of any change of position, the squad members CALL OFF without command.

b. During preliminary training, the command for rotating the members within the squad should be

given only after a movement or command has been executed. After each member of the squad is familiar with the duties of the other positions within the squad, the command may be given before the completion of a movement. In such cases, each man ceases the execution of his duties and takes up the duties of his new position.

38. TO MOVE GUN BY HAND (fig. 5). The squad having taken posts, the squad leader commands: **BY HAND**. Normally the gun is towed by hand to the rear. At this command, Nos. 1 and 2 engage the hooks of their drag ropes in the drag washers on the wheel

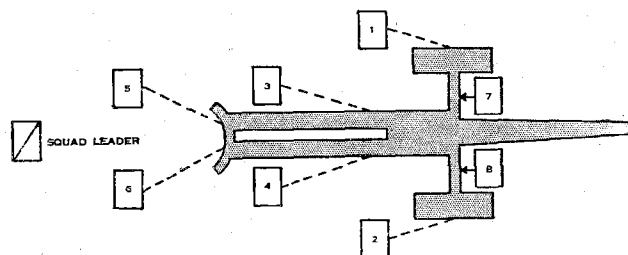
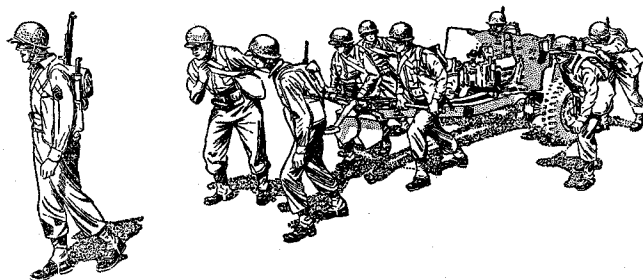


Figure 5. Moving the gun by hand. (Driver is with prime mover.)

hubs. Nos. 3 and 4 engage the hooks of their drag ropes in the towing rings on the trails. No. 4 removes the handspike from the outside of the right trail, and inserts it through the trail lifting handles. Nos. 5 and 6 take positions behind the trails and hook their drag ropes to the locking pin holes in the handspike sockets. Nos. 7 and 8 place the ammunition on the apron or lower carriage and then place themselves alongside the barrel in front of the shield to push on the shield and add weight to the barrel when necessary.

39. TO PREPARE GUN FOR FIRING. a. General. The gun may be prepared for firing when the members of the squad are in or out of ranks, when the gun is being moved by hand or prime mover, at a halt, or in a position of readiness. During preliminary training, however, the squad is trained to prepare the gun for action from the position of posts. After becoming proficient in this operation, the squad will be trained to go into action under varying conditions. At the command **ACTION**, the crew will immediately prepare the gun for firing as described below, regardless of the state of readiness of the gun for firing or of the status of the gun squad. Steps already completed are omitted; such additional steps as may be necessary to prepare the gun properly for firing in the location indicated by the squad leader, such as mounting the telescope in its holder, are added.

b. To place the gun in action. With the gun squad posted, the command is: **ACTION**. At the command **ACTION**—

(1) The squad leader indicates the general direction for firing.

(2) Nos. 3, 4, 5, and 6 raise the trails and turn the gun so that the muzzle points in the direction indicated by the squad leader; they then lower the spades to the ground. Nos. 1 and 2 assist in turning the gun by pushing on the shield or wheels.

(3) The squad leader moves in front of the shield and places his weight on the barrel.

(4) No. 4 unlocks the lunette; No. 6 rotates it to its firing position, and No. 4 locks it in position.

(5) Nos. 1 and 2, with hands nearest the gun, grasp the firing support levers and lower the firing supports.

(6) The squad leader calls "Rear," at which time Nos. 3, 4, 5, and 6 lift the spades slightly off the ground and pull the gun onto the firing supports, assisted by Nos. 1 and 2, who pull on the shield. Nos. 1 and 2 check to be sure that the gun is locked on the firing supports and set the hand brakes.

(7) The squad leader gets off the barrel, lowers the apron, and takes a position to the left of the left wheel and on either knee.

(8) No. 3 unlatches the trail traveling lock and disengages the hook from the loop. Nos. 3 and 5 spread the left trail; Nos. 4 and 6 spread the right trail.

(9) No. 2 then unclamps the trail spreader from the retaining bracket on the right trail by reaching up underneath the right trail and unscrewing it with his right hand. The trail spreader is moved to the open position by No. 2. No. 1 steps over the trails, assumes his firing position, which is on both knees, and locks the trail spreader in place.

(10) Nos. 5 and 6 secure the ammunition and place it to the left rear of the right spade.

(11) Nos. 3 and 4 remove the ammunition from the containers, and arrange it near the right spade, outside the arc formed by the right spade.

(12) No. 3 takes his firing position which is on either knee, near to and inside the right trail, and prepares to pass a round of ammunition to No. 2. No. 4 takes a prone position about 2 paces to the right of the right spade where he can observe to the right.

(13) No. 2 steps over the trail and, with his right hand, releases the traversing stop by pulling out on the traversing stop handle and turning it one-quarter

turn in either direction. He then grasps the breechblock actuating lever, opens the breech and inspects to see that the chamber and bore are clear and clean. He closes the breech, tests the firing mechanism by pulling on the trip lever, opens the breech, and raises the breechblock actuating lever.

NOTE. To close the breech manually, the following method is suggested: lower the breechblock until the stop surfaces on the front face of the breechblock just clear the extractor hooks. With the left hand, palm up, index finger and little finger extended, push the extractors forward. At the same time, allow the breechblock to rise slowly until the stop surfaces on the breechblock are higher than the extractor hooks. Withdraw the left hand from the breech. With the right hand, raise the breechblock actuating lever to the latched position, and the breechblock will rise automatically to its closed position.

(14) No. 2 makes certain that the shifting cam lever is set at SA, assumes his firing position, which is kneeling on the left knee, and calls "Ready."

(15) No. 1 sets the range quadrant at 700 (M24 and M24A1 telescope mounts), glances through the telescope to be sure that it is clear and clean, grasps the elevating handwheel with his left hand and levels the barrel. He tests the traverse by placing his right arm over the traversing shoulderpiece and moving the gun in traverse. When he hears No. 2 call, "Ready," and after he has completed all of his duties he calls, "Up."

(16) Nos. 5 and 6 remove the handspikes from the trail, position them in the handspike sockets, and fasten them by means of the handspike locking pins. No. 5 then moves about 2 paces to the left and rear of the left spade.

(17) Nos. 6, 7, and 8 unload ammunition from the prime mover and performs such additional duties as the squad leader may direct.

40. OUT OF ACTION. a. General. (1) The gun may be taken out of action from a firing position or from a cover position. For preliminary training, however, the squad is trained to go out of action from a firing

position only. After becoming proficient in this operation, the squad will be trained to go out of action under varying conditions. At the command OUT OF ACTION, regardless of the state of readiness of the gun for firing, the gun crew will prepare the gun for movement as described in b below, eliminating any part of the procedure already accomplished or adding to it any steps necessary to comply with the instructions of the squad leader.

(2) If desired, the squad leader may combine the operation of going out of action with an order to move the gun by hand by giving the command: OUT OF ACTION, BY HAND. The squad executes OUT OF ACTION, modifying the procedure and adding the steps necessary to prepare the gun for movement by hand in the most expeditious manner.

b. To place the gun in the traveling position. The command is: OUT OF ACTION.

(1) The squad leader moves in front of the shield and raises the apron.

(2) No. 1 approximately centers the gun in traverse. He then unclamps the trail spreader and swivels it so it may be easily clamped to the right trail. He steps outside the trail.

(3) No. 2 unloads the gun, if loaded, or if unloaded, checks the chamber to be sure it is clear, closes the breech and actuates the firing mechanism. He steps over the trail, reaches up from under the trail, and locks the trail spreader to the right trail.

(4) No. 1 grasps the elevating handwheel and depresses the breech rapidly while Nos. 3 and 5 on the left trail, and Nos. 4 and 6 on the right trail, move the trails until they are about 10 inches apart. No. 1 depresses the breech of the gun until the pillow block pins are aligned with the tapered holes in the lugs at the rear end of the cradle; he then calls, "Close." Nos. 3, 4, 5, and 6 close the trails.

(5) No. 3 locks the trails by connecting the hook and the loop of the trail traveling lock and pressing

downward on the trail traveling lock handle, making sure that the handle is held securely by the latch.

(6) No. 2 locks the traversing stop by pulling out on the traversing stop handle and turning one-quarter turn in either direction. He then pulls inward on the firing support lever with his left hand and holds the lever at its innermost position. With his right hand, he releases the right wheel brake.

(7) No. 1, with his right hand, pulls inward on the firing support lever and holds the lever at its innermost position. With his left hand, he releases the left wheel brake.

(8) The squad leader places his weight on the barrel and commands: FORWARD. Nos. 3, 4, 5, and 6 raise the trails slightly and assisted by Nos. 1 and 2, who push on the shield, move the gun forward off the firing supports.

(9) Nos. 1 and 2 raise and lock the firing supports in the traveling position and take their position of posts.

(10) Nos. 3 and 4 remove the hand spike locking pins, and Nos. 5 and 6 remove the handspikes from the sockets on the left and right trails respectively. Nos. 3 and 4 replace the pins. Nos. 5 and 6 pass the handspikes to Nos. 3 and 4, who fit them into the brackets on the trail. No. 4 lowers the lunette and locks it in the traveling position.

(11) Nos. 5 and 6 place the ammunition to the right rear.

(12) The squad leader and Nos. 3 through 8 take their position of posts.

41. SERVICE OF THE PIECE. a. General. (1) Efficient service of the piece requires the coordinated effort of the entire gun squad. The squad will be trained as a team in the mechanics of servicing the piece prior to firing subcaliber or service ammunition. Simulated firing, using dummy ammunition, will be employed to give practice to the squad in loading, firing, and

unloading. Rapid loading and unloading should be emphasized. Before conducting this training, sufficient instruction must be given to members of the squad in the use of the telescope and in laying the piece to enable them to aim properly. Initially, only fixed targets which are easily seen should be employed; as instruction in marksmanship progresses, all types of targets may be used.

(2) In order to simulate fire, the squad leader will give an appropriate fire order; for example: DUMMY AMMUNITION, RIGHT FRONT, TANK, SIX HUNDRED, ONE LEAD, COMMENCE FIRING.

b. Positions of gun squad during firing (figs. 6 and 7). (1) The squad leader kneels as near No. 1 as is necessary to control the firing and to obtain a view of the target similar to that of No. 1. A suitable position for the squad leader, during drill, is about 1 pace to the left of and on line with No. 1.

(2) No. 1 should be on both knees with the traversing shoulder-piece under his right arm and held to his body in such a manner that by moving his body he can traverse the gun smoothly. His right hand grasps the trip lever underneath the cradle. His left hand is on the elevating handwheel.

(3) No. 2 is in a kneeling position on the left knee. His nearness to the breech depends on his size and the length of his arms. He must be able to load easily. He watches the breech at all times.

(4) No. 3 is on either knee and near the right spade. He should be able to pass a round to No. 2 and be out of the path of the ejected cases.

(5) No. 4 insures that sufficient ammunition is immediately behind and within convenient reach of No. 3. He is 2 paces to the right of the right space in the prone position.

c. To load (figs. 8, 9, and 10). (1) The gun is loaded on the first element of the fire order, unless specifically ordered otherwise.

(2) No. 3 grasps a round with his left hand about

midway on the case. He passes the round to No. 2, placing it against No. 2's chest. No. 2 grasps it with his right hand under the projectile and his left hand at the base. He swings his arms and body toward the breech and carefully inserts the round in the breech opening. He pushes the round into the chamber with his left fist, using a forward and upward motion of his arm. The rim of the cartridge will trip the extractors, allowing the breechblock to rise automatically. When the breech is closed, No. 2, making certain he is clear of the path of recoil, calls, "Up" so that No. 1 will know that the gun is ready to fire; he then

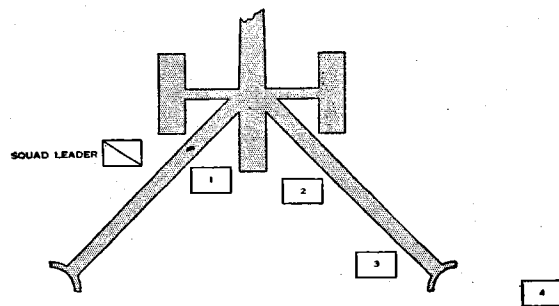
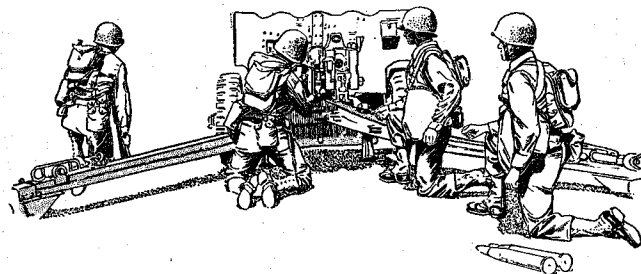


Figure 6. Squad leader, Nos. 1, 2, and 3 in firing positions.

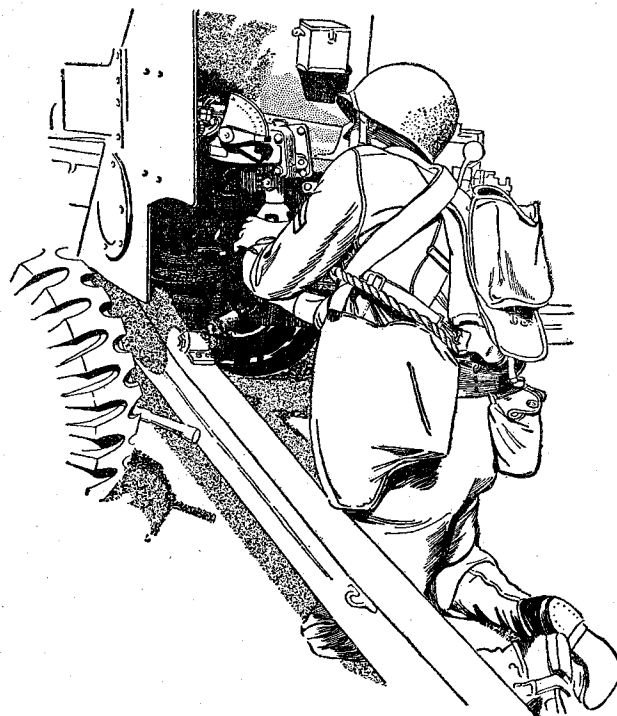


Figure 7. No. 1 in firing position.

watches the breech and swings his hands and body back ready to receive another round from No. 3.

d. To fire the gun. The gun having been loaded and the command COMMENCE FIRING having been given, No. 1 fires as soon as the gun is laid on the target. To fire the gun, No. 1 pulls the trip lever to the rear and quickly releases it. In the event of a misfire, "Immediate action" (par. 15) is applied. During combat, No. 2 immediately unloads the misfire and reloads.

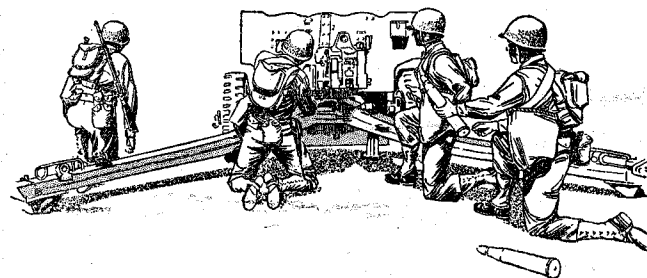


Figure 8. Passing a round to No. 2.

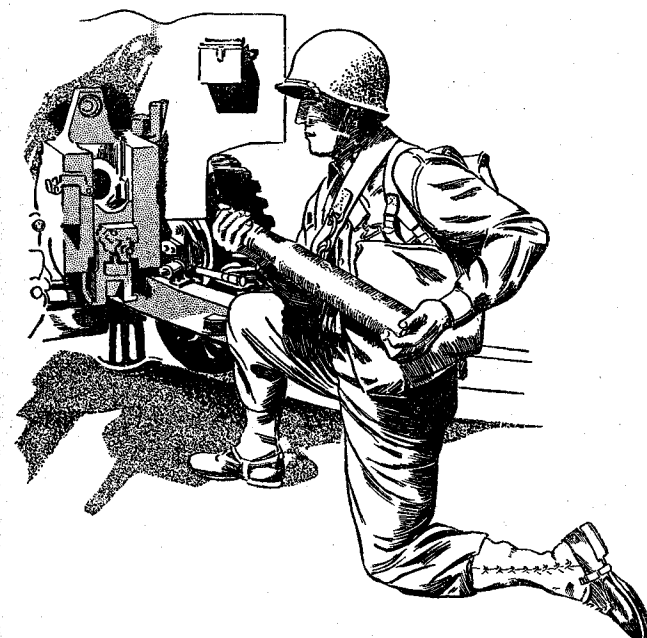


Figure 9. Preparing to load.

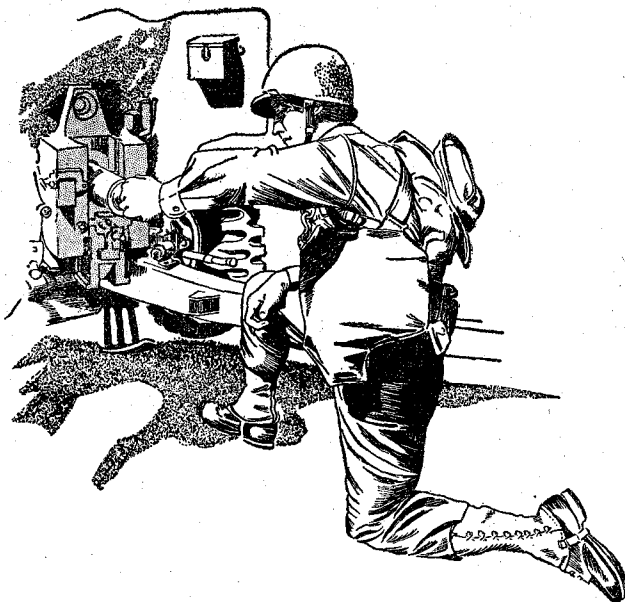


Figure 10. Pushing the round into the chamber.

e. To cease firing. Firing is stopped, and the gun, if loaded is unloaded on command or signal CEASE FIRING.

f. To clear gun. If the gun has been put into action with service or subcaliber ammunition present, the gun must be cleared before anyone moves in front of the muzzle. At the command CLEAR GUN, No. 2 unloads the gun and leaves the breech open. During practice firing, an officer then inspects the gun to make sure there is no ammunition in the chamber. Under service conditions, or in the absence of an officer, the squad leader makes the above inspection. When using subcaliber ammunition, the same procedure is followed, except that —

(1) When firing the caliber .30 subcaliber rifle, all rounds will be ejected from the chamber and receiver, and the bolt left open after ejecting the last round.

(2) When firing the caliber .22 subcaliber rifle, the ammunition magazine will be removed, the chamber emptied, and the bolt left open.

g. To shift trails (new direction) (fig. 11). To fire the gun in a new direction which cannot be reached by traversing, the squad leader, or No. 1, orders: NEW DIRECTION RIGHT (LEFT). At this command, No. 1 centers the gun in traverse. No. 5 grasps the handspike on the left trail; No. 4 grasps the handspike on the right trail, and together they swing the gun to the new direction. No. 3, assisted by No. 4, carries the ammunition to the new position. Nos. 1 and 2 move in conformity to their positions at the gun, releasing the hand brakes before, and resetting them after the move. This movement should be practiced often in preliminary training to insure rapidity of action and the least possible cessation of fire when it becomes necessary to shift the trails while engaging a moving target.

h. To seat trail spades (fig. 12). When time is too limited to dig holes for the trail spades prior to firing the first shot, Nos. 3 (on right) and 4 (on left) will lie across the trails, feet to the rear to assist in reducing the recoil of the carriage and to cause it to seat



Figure 11. Shifting the trails (new direction).

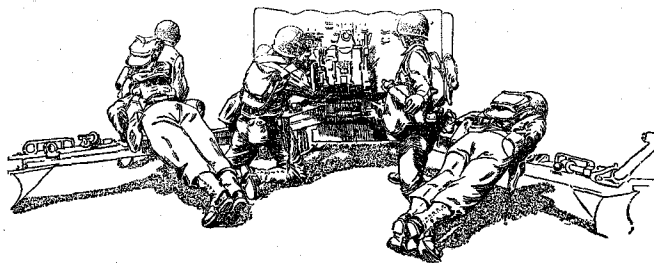


Figure 12. Seating the trail spades.

itself quickly in a stable position. No. 1, under such circumstances, must hold his eye 20 to 25 inches from the eyepiece of the telescope. Whenever time permits, holes will be dug for the trail spades, and the dirt will be dug out from under the wheels, so that the firing supports will rest on the ground.

i. Removal of rammer staff. If, after the gun has been placed in action, it appears desirable to have the rammer staff ready for use, the squad leader directs No. 4 to remove the sections and assemble them.

Section V. ELEMENTARY CREW DRILL WITH PRIME MOVER

42. GENERAL. The provisions of sections III and IV are applicable to training with the prime mover. Details of execution should be modified where necessary, to meet any changes brought about by the presence of the prime mover.

43. EQUIPMENT. For training with the prime mover, individual members of the squad are equipped as prescribed in paragraph 27. In addition, the squad is equipped with a 1½-ton truck, 6 x 6, for towing the gun and transporting the gun squad, accessories,

and ammunition. The truck driver, who is a member of the gun squad, operates the vehicle under direct supervision of the squad leader.

44. CARE OF TELESCOPE. a. The telescope should be removed from the gun whenever its use is not necessary. Exposure to moisture and other elements, rough handling, and jarring, may render the telescope unusable.

b. No. 1, under the direction of the squad leader, will remove the telescope when the gun is to be moved by prime mover for considerable distances or at any but very slow speeds, and will replace it when action is anticipated. He will also remove and protect it from dew or inclement weather to prevent the condensation of moisture or the formation of ice in the telescope.

45. DISPOSITION OF GUN COVERS. The gun covers should be on the gun whenever it is towed, whenever it is to be separated from its prime mover for a considerable length of time, or when it may be exposed to a gas attack or inclement weather. For preliminary training with the prime mover, however, the gun covers will be placed on the gun whenever it is coupled, and removed whenever it is uncoupled. After removal, the squad leader will indicate whether the covers are to be left in the prime mover or taken with the gun. If taken with the gun, the covers are bundled up and tied to the front of the shield.

46. TO LOAD PRIME MOVER. The command is: **LOAD TRUCK.** At this command, the gun is coupled to the prime mover and the ammunition and equipment loaded on the prime mover under the direction of the squad leader as follows:

a. The gun is moved to a position in rear of the prime mover, convenient for coupling, and the trails are grounded.

b. Nos. 5, 6, 7, and 8 load the prime mover. Nos. 7 and 8 take position in the prime mover and pass out the gun covers to Nos. 5 and 6, and stow the ammunition and equipment passed to them by Nos. 5 and 6.

c. Nos. 1 and 2 replace the breech cover; Nos. 5 and 6 replace the muzzle cover.

d. When all the ammunition and equipment have been loaded, the gun is coupled to the prime mover. Nos. 3 and 4 raise the trails and insert the lunette over the towing pintle hook and secure the latch. Nos. 5 and 6 assist by pushing the gun forward from positions at the right and left wheels, or at the shield.

e. The men then mount on the prime mover and take seats (fig. 13). The squad leader takes the seat besides the truck driver; Nos. 7, 5, 3, and 1 in that order from front to rear sit on the right side of the prime mover, Nos. 8, 6, 4, and 2 on the left side.

f. If operating with other prime movers, the squad leader signals, "Ready to start" to the next higher commander; otherwise the truck moves in accordance with the squad leader's instructions.

g. The truck driver should be trained to assist in loading the prime mover.

47. TO UNLOAD PRIME MOVER. a. The squad being in the prime mover, the command is: UNLOAD TRUCK. At this command, all members of the squad, except Nos. 7, 8, and the truck driver, will dismount and take positions at the rear of the prime mover. The gun is uncoupled and the prime mover unloaded as follows:

(1) Nos. 1 and 2 remove the breech cover; Nos. 5 and 6 remove the muzzle cover and place both covers either in the prime mover or on the gun carriage (par. 45), as directed by the squad leader.

(2) At the same time, Nos. 3 and 4, working on the right and left sides of the trails, respectively, uncouple the gun, No. 3 calling, "Forward" to the truck driver as the lunette is pulled clear of the pintle. The

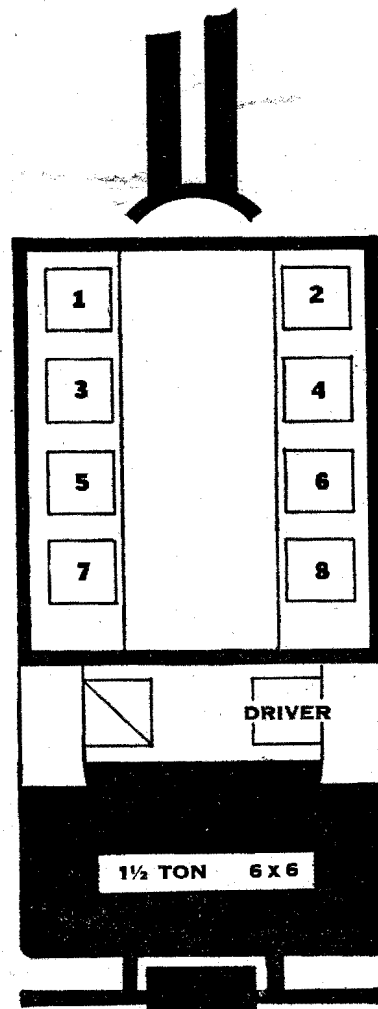


Figure 13. Positions of the gun squad in the prime mover.

prime mover moves forward about 3 paces and Nos. 3 and 4 ground the spades.

(3) Nos. 7 and 8, from their positions in the prime mover, pass initial loads of three rounds each to Nos. 5 and 6, who place them on the ground near the gun. Nos. 7 and 8, unload additional ammunition and equipment as directed by the squad leader, then dismount.

(4) When the gun, ammunition, and equipment have been unloaded, the members of the squad take posts, or continue their duties to prepare the gun for movement by hand, or for action, depending upon the instructions of the squad leader.

(5) When unloaded, the prime mover is driven to a nearby position of cover as directed by the squad leader, or as prescribed by higher command.

b. The command UNLOAD TRUCK may be given when the squad is dismounted from the prime mover and the men are in or out of ranks. The truck driver, if dismounted, takes his seat in the truck, Nos. 7 and 8 mount, and the gun is uncoupled; the prime mover is unloaded as described in a above.

c. Additional ammunition and equipment, if present, are unloaded and stacked in accordance with instructions of the squad leader. To expedite the unloading, the truck driver will assist Nos. 7 and 8. Nos. 1 and 2 also assist in unloading after they have completed their prescribed duties.

48. UNCOUPLING EXPEDIENT. As a battlefield expedient, the following improvisation may be made to reduce the time required for unloading the truck: on prime movers which are equipped with a spring type pintle latch, run a wire cable from the pintle latch to the driver's seat. Whenever speed is essential, the driver turns the vehicle so that the muzzle of the gun is pointing generally in the direction of fire, slows to 5 mph, pulls the cable, and speeds up slightly. This releases the lunette from the pintle and drops the

spades to the ground, and materially reduces the time for placing the gun in action. In training, the spades should be dropped only in soft ground.

49. TO DISMOUNT. The squad being in the prime mover, the command or signal is: DISMOUNT. All (except the driver) get out of the prime mover, leaving the gun equipment in the prime mover. If the command FALL OUT follows, the men leave ranks and the truck driver dismounts. They remain in the vicinity of the prime mover. The squad leader may direct other necessary action after dismounting the squad, such as FALL IN, UNLOAD TRUCK, or ACTION.

50. TO MOUNT. The squad being in or out of ranks (par. 33), the command or signal is: MOUNT. The driver takes his place and the remaining members of the squad take their prescribed seats in the prime mover. The squad leader checks the men and, when all are present, signals, "Ready to start" to his next senior commander, if operating with other vehicles; otherwise he directs the movement of the prime mover.

51. CASTER WHEEL DRILL. a. General. For units having guns equipped with the caster wheel, drill (secs. III, IV, and V) will be modified as follows:

b. **To move the gun by hand** (fig. 14). (1) Prior to fastening tow ropes to the gun, Nos. 3, 4, 7 and 8 raise the trails so that the trail spades are approximately 3 feet from the ground.

(2) No. 5 removes the handspike locking pin from the handspike fork of the caster wheel and places it in the fork spindle. No. 5 brings the caster wheel forward and positions it beneath the trails.

(3) Nos. 3, 4, 7, and 8 lower the trails on the caster wheel. No. 5 raises the locking plate, positions it on top of the trails, rotates it one-quarter turn in either direction and locks it in place by tightening the nut.

(4) No. 6 secures a handspike and, maintaining his grip on the rear end, passes its front end forward to No. 4 who removes the locking pin from the caster wheel spindle and locks the handspike in position.

(5) No. 6 secures the other handspike and, assisted by No. 5, places it through the collar of the handspike attached to the caster. No. 5 locks it in place.

(6) Nos. 5 and 6 then take positions at the handspike to assist in moving the gun by either pushing or pulling on the handspike.

(7) Nos. 7 and 8 place the ammunition on the apron or lower carriage and then assist in moving the gun by pushing against the shield.

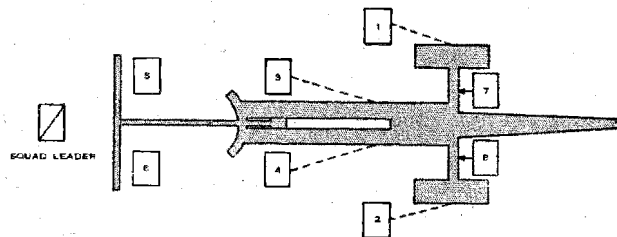


Figure 14. Moving the gun by hand with trail caster.
(Driver is with the prime mover.)

c. To prepare gun for firing. (1) After the squad leader places his weight on the barrel and the firing supports are dropped by Nos. 1 and 2, the gun is pulled onto the firing supports without raising the lunette.

(2) No. 5 raises the longitudinal handspike. No. 6 pulls the handspike locking pin to release and remove this handspike to the right.

(3) No. 3 unlocks the trail traveling lock. No. 4 loosens the nut.

(4) With the squad leader's weight on the barrel, No. 3 spreads the left trail and No. 4, the right.

(5) No. 5 pulls the caster wheel approximately 3 paces to the rear, removes the handspike locking pin from the handspike fork and places and locks the handspike in the handspike socket on the left trail.

(6) Nos. 4 and 6 raise and lock the lunette.

(7) No. 6 places and locks the other handspike in the handspike socket on the right trail.

d. Out of action. (1) After the trails have been closed and the lunette lowered, the squad installs the caster wheel as described in b above.

(2) Nos. 3, 4, 7 and 8 push the gun off the firing supports, keeping the trails raised while No. 5 brings the caster wheel forward and positions it beneath the trails. Because the trail spades are off the ground, as the gun is pushed off the firing supports, it will be necessary for Nos. 1 and 2 to limit the forward movement of the gun by applying the hand brakes.

e. To load prime mover. (1) After the covers have been placed on the gun, and prior to coupling the gun to the prime mover, the caster wheel will be removed. The procedure will follow that described in d above, except that the trails will not be unlocked.

(2) To remove the caster wheel with the trails closed, No. 6 will hold the handspikes, while No. 5 removes the handspike locking pin from the handspike fork.

(3) No. 6 separates the handspikes, No. 4 loosens

the nut, and No. 5 removes the caster.

(4) All matériel is placed in the prime mover.

f. To **unload prime mover**. The caster wheel will remain in the prime mover unless the squad leader's subsequent command requires that it be placed on the gun or in the vicinity of the gun.

Section VI. ADVANCED CREW DRILL

52. PURPOSE AND SCOPE. a. The primary purpose of advanced crew drill is to develop an efficient operating procedure for the squad under field conditions. The squad, with complete individual and unit equipment, is taught to adapt all of the operations prescribed in sections III, IV, and V to varied field conditions. Training is conducted on varied terrain under all conditions of visibility and weather.

b. The general instructions in the paragraphs below do not cover the entire scope of advanced training. They are based upon practical tests and experience and emphasize important features. They are offered as a guide only, and may be modified, as the unit becomes experienced and develops its own procedure.

53. EQUIPMENT. Camouflage nets will be included in addition to the equipment prescribed for elementary training.

54. MOVING WITH GUN COUPLED TO PRIME MOVER.

a. The prime mover is operated in accordance with the regulations and instructions contained in FM 25-10. Provisions of FM 22-5, where pertinent, are applicable.

b. When operating over very difficult terrain, the gun crew should dismount and be prepared to assist the vehicle forward when necessary. Under certain

conditions, it may be desirable to uncouple the gun from the prime mover and move each independently.

c. The truck driver is taught that, while it is essential for the unit to arrive at the firing position quickly, it is even more important that the gun is not injured en route. He is trained to understand fully the travel limitations of his vehicle with the gun coupled. He is taught the clearance of the prime mover and gun carriage when operating over rough ground; how to negotiate turns and avoid obstacles without injuring his vehicle and gun; and the effect the trailing gun has on the truck when starting and stopping.

d. In order to prevent damage to the truck or the gun, the following common sense rules are observed:

(1) Do not increase speed in turning about to couple or uncouple the gun.

(2) Do not exceed 30 mph on good roads.

(3) Reduce speed —

(a) Upon unimproved, slippery, winding roads.

(b) When passing other vehicles or troop columns.

(c) Approaching areas where road blocks or obstacles are probable.

(d) When visibility is poor.

e. Whenever practicable, the route the vehicle is to follow should be reconnoitered in advance. Movement over unreconnoitered routes may result in unnecessary delay at unexpected obstacles or necessitate selecting a new route, requiring backtracking and a loss of time disastrous to the accomplishment of the assigned mission.

55. MOVING UNCOUPLED GUN. a. Facility in moving the gun by hand over difficult terrain is gained only by repeated practice.

b. The uncoupled gun is usually moved from the—

(1) Prime mover to cover or firing position.

(2) Cover position to a firing position or the reverse.

(3) Primary firing position or cover position to an

alternate or supplementary firing position.

(4) Firing or cover position to the prime mover.

c. Movements by hand should be made as short and, except when required by combat necessity, as seldom as practicable.

d. Moving a loaded gun except to change direction in firing is prohibited. This rule will be enforced even while training with dummy ammunition.

e. Whenever practicable, the route to be followed by the gun crew, when the gun is moved by hand, should be reconnoitered in advance by the squad leader. When time does not permit such advance reconnaissance, the squad leader rapidly precedes the squad, giving the direction of movement and simultaneously reconnoitering the route ahead.

56. MOVEMENT OF PRIME MOVER. The squad leader directs the movement of the prime mover when the gun is moved by hand. Usually he will direct it to join other trucks of the platoon at a previously designated point or he will order the vehicle to await further orders, in the nearest available cover. When the prime mover is placed under cover, the truck driver removes his rifle from the carrier on the truck and carries it with him. He is responsible for concealing his vehicle and is trained to use his camouflage net for this purpose. The position of the prime mover is usually within visual signaling distance of the cover or firing position, in order to bring it forward quickly should a change of position or OUT OF ACTION be necessary. The truck driver is trained to maintain visual contact with the squad leader and reconnoiter routes leading from the prime mover to the gun. Usually, when changing position the gun will be drawn by hand to the position where the prime mover has been ordered to report. Repeated training is given the gun crew and truck driver in this operation with a view to reducing to a minimum the possibility of hostile observation.

57. APPROACH TO FIRING POSITION. The squad is trained to approach and occupy varied cover and firing positions. The following procedure is suggested: the squad leader, or his representative, leads the vehicle by a previously reconnoitered route to an uncoupling position close to the firing position, where the gun is uncoupled from the prime mover. This location will be determined by the terrain and the enemy situation. At this point, instructions should be given relative to ammunition supply, disposition of the prime mover, and movement of the gun by hand. The gun is then moved by hand at the direction of the squad leader to a point where preparations are made for firing. Observation of the battlefield must be continuous. The final movement into firing position will be executed by the crew, pushing the gun, muzzle forward, so that the shield provides protection from enemy small-arms fire. (See fig. 15.)

58. PREPARING FIRING POSITION. The extent to which a firing position is prepared depends upon the tactical situation, particularly in relation to the time available and the contemplated action. It must be remembered, however, that the guiding principle in the preparation and organization of a position is to fire without delay. Such operations as digging in the gun and ammunition and provision of individual shelter

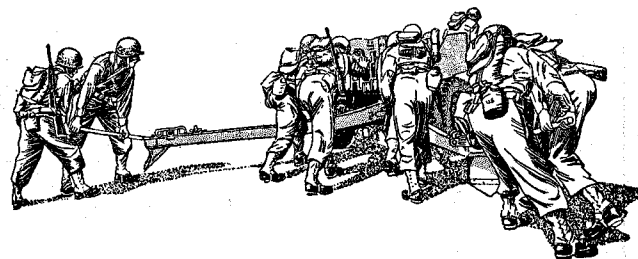


Figure 15. Pushing the gun.

are subordinate to immediate delivery of fire. For training purposes, the squad will be instructed in occupying and preparing firing positions in accordance with specific situations. In addition, the following must also be considered:

a. In the attack, the gun is usually fired from positions which afford good natural concealment. Maximum advantage is taken of partial defilade. Cover and concealment for the gun crew in the immediate vicinity of the firing position, or in a cover position, should be provided.

b. Proper concealment is essential, and the squad must be trained to camouflage the firing position expertly. The squad should be trained to take full advantage of all available natural foliage and to use the camouflage net.

c. When the gun is placed in partial defilade, a check should be made by a quick glance through the gun barrel (not through the telescope) to insure that the projectile will clear the cover. Measures should be taken to reduce the effect of muzzle blast before the gun is fired, such as thoroughly dampening the ground in front of the muzzle.

d. In defense, the basic type of emplacement is the fan type. See FM 7-35 for details.

e. The gun should have an excellent field of fire.

f. Holes should be dug for seating the trail spades, regardless of the direction in which the gun is to be fired.

g. When practicable, ammunition is placed below ground in such manner that it is protected and readily accessible to the gun crew. Its location should not interfere with the occupation of the firing position or the quick shifting of the gun in traverse. If time is available, covering should be placed over the ammunition.

h. Local protection in the form of wire, mines, other artificial obstacles, or natural obstacles, is desirable.

i. Covered approaches between the firing position

and the location of the prime mover should be reconnoitered and used.

59. COVER POSITION. a. The firing position is usually subject to hostile fire and observation. It is therefore essential that the gun and equipment be kept under cover in close proximity to the firing position and so concealed that the enemy cannot recognize or discover the firing position prior to opening fire. This nearby position is known as the cover position. The squad is trained in selecting and preparing cover positions and should practice repeatedly the occupation and evacuation of the firing position. Care must be exercised in such training to insure that the gun or crew is not silhouetted against the skyline or bright background.

b. Suitable cover positions may be found in draws, reverse slopes, wooded areas, behind cliffs, cut banks, or heavy stone fences. Equipment and personnel should be so situated that they are well concealed.

c. In open terrain, nearby cover and concealment may be scarce, and a suitable cover position may be lacking. The unit is trained to resort to artificial means for cover and concealment. Use of camouflage for this purpose is emphasized. However, in a surprise meeting with enemy tanks or mechanized forces, speed in delivering effective fire upon the enemy will be a more important consideration than cover and concealment. Consequently, the squad should be trained to move rapidly into a firing position directly from the prime mover.

d. While in a cover position, the gun, equipment, and ammunition are prepared for firing as far as practicable. The degree of preparedness depends upon the distance between the cover position and the firing position, and the character of the intervening terrain. When the command ACTION is given, the gun is quickly moved into the firing position to engage the enemy.

e. If the gun is in a cover position and the squad

leader wishes to occupy the firing position quickly and engage a target, he may employ one of the following methods:

(1) *If target is visible from cover position.* The squad leader commands: LEFT FRONT, EDGE OF WOODS, TANK FOURTH FROM LEFT, EIGHT HUNDRED, ONE LEAD. The gunner announces that he recognizes the target. The squad leader then commands: ACTION. Upon the command ACTION, the gun is moved quickly into its firing position, prepared for action, and laid on the target. Firing begins at the command COMMENCE FIRING.

(2) *If target is not visible from cover position.* Upon the command ACTION, the gun will be moved into the firing position quickly and prepared for action; the fire order follows: FRONT, TANK THIRD FROM RIGHT, SIX HUNDRED, ONE LEAD, COMMENCE FIRING. Fire is opened when the gun is laid on the target.

60. ALTERNATE AND SUPPLEMENTARY FIRING POSITIONS. An alternate position should be selected for each primary firing position. The squad is trained to move rapidly from its primary firing position or cover position into an alternate position and open fire on the enemy. An alternate firing position is a position from which the same fire missions can be executed as from the primary firing position. Similar training is conducted in connection with the occupation of supplementary positions. A supplementary position is a position from which can be executed fire missions other than those to be executed from the primary position. An alternate position should be selected for each supplementary firing position. Care must be exercised by the squad, while changing position, to take full advantage of available cover and concealment to avoid enemy observation.

61. RANGE CARDS (fig. 16) . a. Immediately upon occupation of a position, the squad leader should pre-

pare a range card for his gun. The purpose of the range card is to familiarize the squad with the ranges to the prominent terrain features surrounding the gun. The use of the range card will facilitate rapid determination of ranges to targets wherever they may appear regardless of the supposed direction of the enemy.

b. The squad leader should make a range card for each of the positions — primary, alternate, and supplementary. The card should show the gun position, principal direction of fire, a means of orientation, a 360° sector of fire, principal terrain features and ranges thereto.

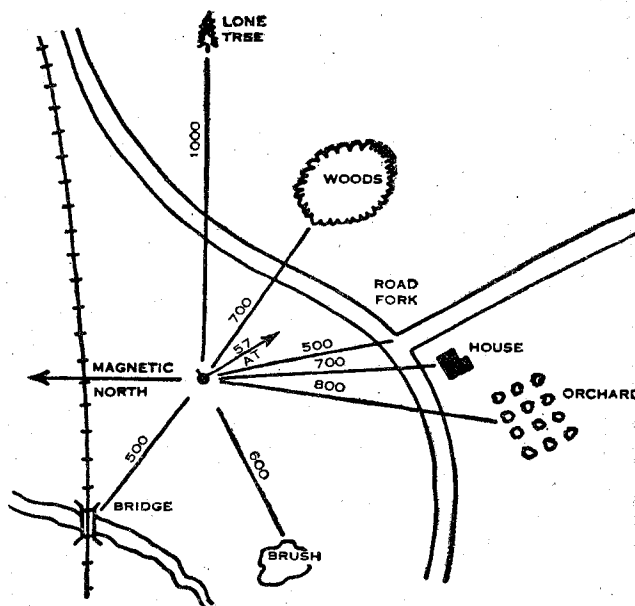


Figure 16. Range card.

62. **AVOIDING HOSTILE FIRE.** The gun crew must be trained to take cover quickly to avoid a hostile artillery concentration. While firing, at the command or signal, DOWN, or TAKE COVER, Nos. 1, 2, and 3 spring sideways from the gun. All members of the crew lie close to the ground, taking advantage of nearby natural cover and concealment, or seeking protection in fox holes.

63. **CHANGE OF POSITION.** a. The importance of training in the rapid movement of the gun from one firing position to another, or to a cover position, must be understood by all members of the gun squad. Once fire has been opened, the gun will immediately draw fire from an alert enemy. The squad, although trained not to withdraw during a tank attack, must be trained in methods of changing its position when necessary to fulfill its mission. The squad must be trained to accomplish these movements with a minimum loss of time and with a minimum amount of exposure to observation and fire. Movement to a new position will usually be made during a lull in or at the completion of the fire fight. The methods set forth in b and c below are given as a general guide.

b. With the gun in a defiladed position, the squad leader commands: OUT OF ACTION, BY HAND, or OUT OF ACTION, LOAD TRUCK, if the truck can be brought to the gun position. The squad executes the command. However, if the gun position is in partial defilade, the squad will pull the gun back to full defilade before executing the command. To bring the truck forward to the loading point, the squad leader signals ASSEMBLE to the truck driver, who brings the truck forward and halts, facing in the direction indicated by the squad leader.

c. When the gun is in a position from which going out of action would expose the squad, and cover is close at hand, the squad leader commands: OUT OF ACTION, COVER CLOSE BEHIND (or otherwise). The squad unloads the gun, closes the trails, pushes

the gun off the firing supports, and pulls it to the cover position. Once in the cover position, the squad completes the operation of taking the gun out of action, or moves it to a new position as directed by the squad leader.

64. **AMMUNITION SUPPLY.** The squad is trained in moving ammunition from the prime mover to the firing position. During action, the squad leader must know at all times the amount of ammunition on hand, and where and how he can replenish it. Sufficient ammunition must be available at the gun position to insure successful completion of the fire missions. Upon occupation of a firing position, the squad leader indicates the amount of ammunition to be placed in the close proximity of the gun. Arrangements are made for rapid replenishment of ammunition from the prime mover. The amount of ammunition used for the accomplishment of a fire mission should be reported to the platoon leader, who must arrange for its replenishment. For duties of the platoon leader in ammunition supply, see FM 7-35.

Section VII. LAYING THE GUN

65. **PURPOSE.** The purpose of training in laying the gun is to teach members of the squad to lay the correct sight picture on the target, and in the case of a moving target, teach them to maintain the correct sight picture and take new sight pictures as the target moves.

66. **SCOPE.** a. Training in laying the gun is divided into two phases:

- (1) Aiming and gun manipulation.
- (2) Tracking and simulated firing.

b. Instruction in the first phase of training forms the basis for training in the second phase. It is essential that the sequence of instruction be such that each member of the squad becomes proficient in the first phase before proceeding to the second.

c. Two telescopes are issued for use with the 57-mm gun M1. The use of each in laying is discussed in the paragraphs below.

67. METHOD OF INSTRUCTION. a. General. Training in laying the gun consists primarily of a series of exercises in which each member of the squad becomes familiar with the methods of aiming, gun manipulation, tracking, and simulated firing. The methods of instruction described in FM 21-5 will be followed.

b. Training for aiming and gun manipulation. (1) Training is divided into three steps:

- (a) Aiming for range.
- (b) Aiming with leads.
- (c) Aiming for range and lead.
- (2) Initially, members of the squad must understand the use of the telescope reticle in firing at various ranges. Each man must learn the correct sight picture and the selection of aiming points on the reticle. The second step is aiming with leads in which each man must understand angular leads and how to take leads using the reticle. The third step combines the first two, and each man learns to aim for range and leads. Accuracy of each sight picture and speed in manipulation of the gun in setting sight pictures is the goal in this training. This training should be conducted using stationary targets only.

c. Training for tracking and simulated firing. (1) Training in this phase is divided into two steps:

- (a) Tracking moving targets.
- (b) Simulated firing on a moving target.
- (2) This phase of instruction teaches the soldier to maintain the correct sight picture on a moving target, and to change sight pictures as he continues to track

the target. After each man has demonstrated his ability to track a moving target, he should be advanced to training in simulated firing. This training should be conducted if possible on the 1,000-inch range.

d. Equipment. The following equipment is required for training three squads:

- (1) 3 57-mm guns M1.
- (2) 1 transparent diagram of the telescope reticle.
- (3) 1 small portable blackboard.
- (4) 2 portable standing frames and the following improvised aiming silhouette targets (fig. 30):
 - (a) 2 single-tank.
 - (b) 2 multiple-tank. (See par. 68e.)
- (5) 1 sled, target carrier.
- (6) Stop watch.
- (7) Tape measure, 50 feet or longer.
- (8) One progress chart (shown below) for each squad undergoing instruction.

e. Procedure (fig. 17). (1) Initial training in laying the gun can be conducted in the immediate vicinity of barracks. A cleared, fairly level area of ground measuring about 180 feet by 45 feet will accommodate a three-gun platoon.

(2) The arrangement shown in figure 17 permits simultaneous instruction of all gun squads within a relatively small area and facilitates control and supervision by the platoon leader. Instruction for the assembled platoon is conducted at some convenient point, such as D. Upon the completion of this instruction, the men are sent to their respective guns along the lines A-B and E-F. Here, the squad leaders conduct individual instruction under the direct supervision of the platoon leader or trained assistant instructors. For aiming exercises, the portable aiming targets, with aiming silhouettes (fig. 30) on both sides, are arranged along line C-D.

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X X

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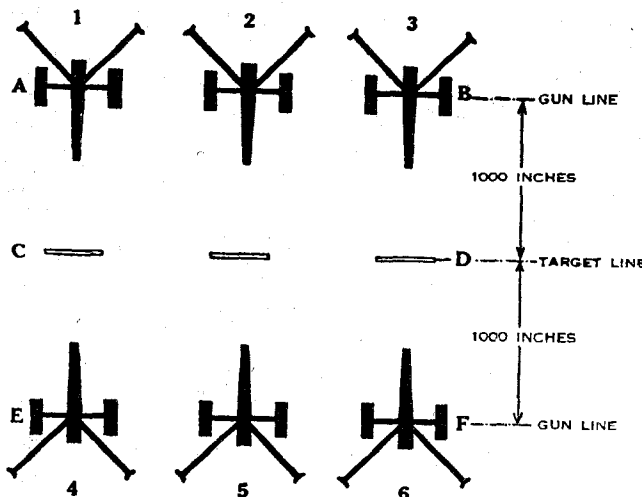


Figure 17. Gun and target arrangement for aiming and tracking.

68. AIMING AND GUN MANIPULATION — TELESCOPE

M18. a. Aiming for range. (1) *Initial laying.* Initial laying of the telescope on a stationary target for range is a matter of placing the intersection of the vertical and horizontal cross hairs on the target after the gunner has set the desired range on the range quadrant. The point of aim on all targets is the center of the visible mass or the center of the target. Due to the flat trajectory of the 57-mm projectile, it is not necessary to have a different setting on the quadrant for every 100 yards of range for the initial lay. Using the M24 telescope mount, the 300-yard setting is used for all ranges up to 300 yards. Use the 700-yard setting for ranges from 400 to 700 yards. For all ranges over 700 yards, the 900-yard setting is used. When using the M24A1 telescope mount, the 300-yard setting is used for ranges up to 300 yards. Use the 500-yard setting up to 500 yards; the 700-yard setting up to

700 yards; the 900-yard setting up to 900 yards; the 1,100-yard setting up to 1,100 yards; and the 1,300-yard setting up to 1,300 yards. The scale is graduated in 100-yard units from 1,300 to 2,500 yards for exact setting when firing at stationary targets.

(2) *Subsequent laying* (fig. 18). (a) To secure effective hits on various types of targets, it will be necessary to make range changes smaller than those provided for on the range quadrant. Range changes of 400 yards or less will be made by interpolation on the telescope reticle. If range changes exceed 400 yards, changes must be made on the range quadrant. The range unit will seldom be less than 200 yards.

(b) Intersecting the horizontal line on the reticle are four vertical lines. Changing the aiming point on the reticle from the horizontal line to the top or bottom of the vertical lines will vary the range approximately 400 yards. Interpolation should be made on this basis.

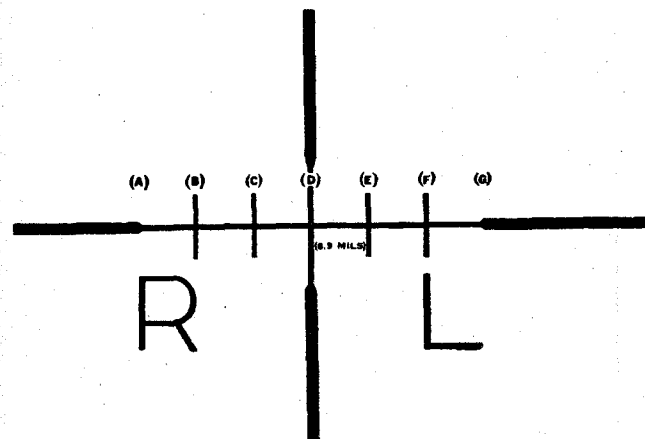


Figure 18. Reticle, M18 telescope (letters and numerals shown in parentheses do not appear on the reticle).

UF
A
#2
bL

(3) *Exercises.* These exercises are conducted on stationary aiming silhouette targets so that instruction in aiming will not involve the more advanced element of tracking. Exercises should be designed to require the gunner to set the range quadrant and sight picture for the initial order, following that with range changes of less than 400 yards which he must make by interpolation on the telescope reticle.

b. Aiming with leads. (1) The technique of engaging a moving target differs from that of engaging a stationary target in that the axis of the bore must be aimed ahead of the target to cause the projectile and target to meet. A 30-minute or 8.9-mil angular lead has been taken as the unit of measure of leads. To afford the gunner a scale for applying these leads, the telescope reticle is provided with a horizontal line graduated in six 8.9-mil units, three on either side of center. Points below *A* and *G*, shown in figure 18, where the line begins to thicken, are the 3-lead markings.

(2) The gunner is taught how to apply the lead graduations when engaging a moving target. (See fig. 18.) In aiming at a moving target, the bore must be aimed ahead of the target. The vertical cross hair in the center of the telescope indicates the direction of the bore of the gun. Thus, if a gunner is engaging a target moving to the right with one lead, and the correct range has been set on the range quadrant, the vertical cross hair in the center of the telescope is to the right (ahead) of the target. He places the intersection of the horizontal cross hair and vertical line *C* on the target. The intersection of the horizontal cross hair and line *E* is used if the target is moving to the left.

(3) When aiming for one-half leads, the gunner interpolates between the lead markings.

(4) The letters "*R*" and "*L*" are etched on the reticle as an aid in aiming at the target. If the target is moving to the *right* the lead markings above the

letter "*R*" are used as aiming points; if the target is moving to the *left* the lead markings above the letter "*L*" are used.

c. Exercises consist of having the squad member lay the appropriate lead marking on an aiming silhouette target. Stationary targets assumed to be moving right or left should be used. One-half leads should be included in the instruction.

d. Aiming for combined range and lead. (1) *Initial laying.* Range and lead are combined automatically on the telescope reticle by setting the range on the range quadrant, and using the appropriate lead mark.

(2) *Subsequent laying.* Changes in range of 400 yards or less are made by interpolation above or below the horizontal line. Therefore, it will be necessary when measuring for one-half lead to project an imaginary intersection of the proper aiming point for range and the appropriate lead. This intersection becomes the aiming point to be placed on the target.

(3) *Exercises.* Each squad member is required to lay the gun with different ranges and leads on an aiming silhouette target, an assumed direction of travel being specified in each case. These exercises require the gunner to interpolate on the telescope reticle.

e. Exercises to develop speed in manipulation. Finally, to develop facility in manipulating the elevating handwheel and the traversing shoulderpiece, the gunner is taught to engage the successive tank target. This target consists of three rows of three aiming silhouettes (fig. 30), equally spaced on the target paper. The target is not an item of issue. In this exercise, the silhouette target to be engaged, an assumed direction of movement of the target, and a range and lead are announced as, "Center tank, right to left, eight hundred, one lead;" the gunner lays the gun accordingly. Different tanks are then successively designated as "center right tank" or "lower left tank;" and any changes in direction of travel, range, or lead

desired are announced; the gunner complies with each new order.

69. LAYING GUN WITH OPEN SIGHT. a. General. The telescope mounts M24 and M24A1, are equipped with an open sight for use when the telescope is damaged. The open sight consists of two parts:

- (1) A front band.
- (2) A horizontal and a vertical cross hair encased in a frame.

b. Aiming for range. The gunner sets the range on the range quadrant. (See par. 68.)

c. Aiming with leads. The gunner sets leads by turning the deflection knob on the mount. Turning the deflection knob one click is equal to setting a lead of 20 minutes or approximately 6 mils. *Example:* If the target requires two leads and is moving to the left, the gunner sets two leads left on the deflection scale. In this case, since the deflection is set on the open sight, the gunner aligns his sight on the center of the mass of the target. He does *not* aim ahead of the target.

d. Sight picture. For initial laying, the gunner places the intersection of the vertical and horizontal cross hairs on the center of the front bead, and places that sight picture on the center of the visible mass or the center of the target. Subsequent laying is accomplished by interpolation.

70. AIMING AND GUN MANIPULATION — TELESCOPE

M69C (figs. 19 and 20). **a. Aiming for range.** (1) *Initial laying.* The telescope M69C is provided with range graduations on the reticle. At the top of the etched portion is a small cross hair which marks the center of the telescope and represents a range of zero yards. Directly below the small cross hair is a series of vertical lines each corresponding in length to a range change of 200 yards. The vertical lines are separated by spaces each of which corresponds to a range change

of 200 yards. The bottom of the lowest vertical line represents a range of 3,400 yards. Short horizontal lines extend to the right and left of the vertical lines and are spaced vertically to correspond in range to the top of each vertical line. The short horizontal lines are numbered every 800 yards. In aiming at a stationary target or a moving target requiring zero leads, the aiming point on the reticle representing the correct range is laid on the center of the visible mass or the center of the target.

(2) *Subsequent laying.* Subsequent laying is identical with initial laying since the range unit used is seldom less than 200 yards.

(3) *Exercises.* These exercises are conducted on stationary aiming silhouette targets so that aiming will

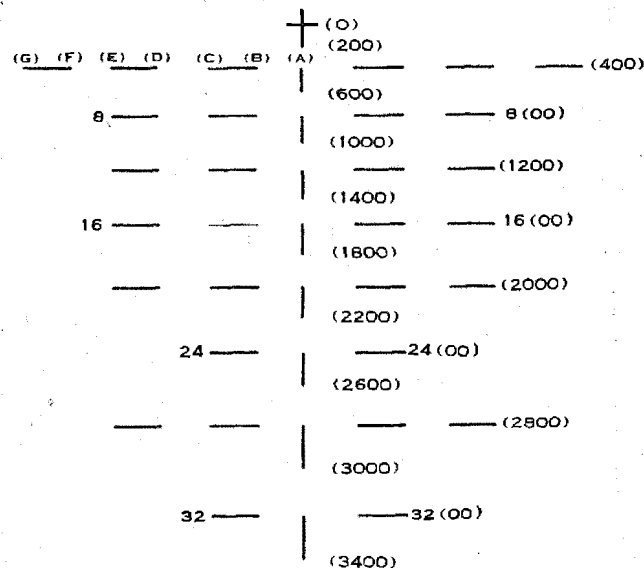


Figure 19. Reticle, M69C telescope (letters and numerals shown in parentheses do not appear on the reticle).

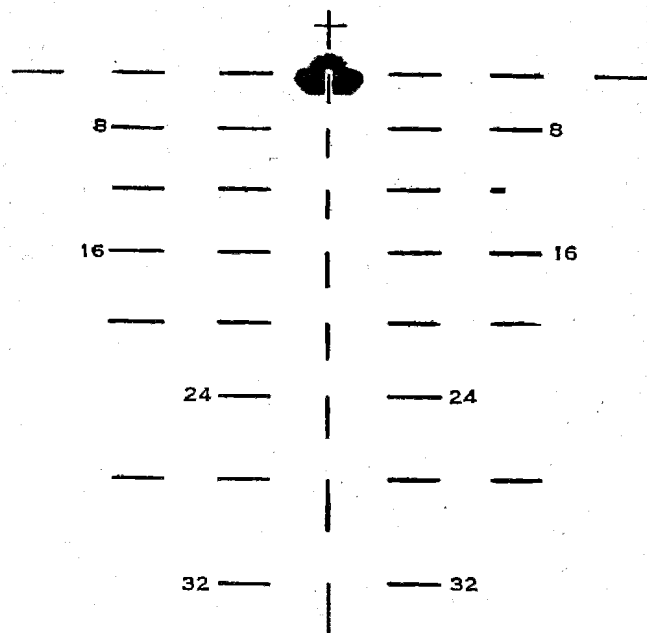


Figure 20. Aiming, M69C telescope. Stationary target, range 400 yards.

not involve tracking. Exercises require the gunner to set the correct sight picture for every 200 yards of range.

b. Aiming with leads. (1) The technique of engaging a moving target differs from that of a stationary target in that the axis of the bore must be aimed ahead of the target to cause the projectile and target to meet. A 5-mil angular lead is taken as the unit of measure. With the telescope M69C, "one lead" corresponds to a 5-mil lead. Two leads are 10 mils. Lead markings are etched on the reticle by a series of horizontal lines, 5 mils in length, with a distance of

5 mils horizontally between lines. Referring to figure 22, point *B* is 5 mils from point *A* and represents one lead. The line *BC* is 5 mils in length; point *C* represents two leads. Horizontal lead markings on each side of the series of vertical lines are identical. Thus, if a gunner is engaging a target at a range of 400 yards, moving from left to right and requiring one lead, he places point *B* in the center of the target. The series of vertical lines must be out ahead of the target. For a target moving from right to left, the lead markings on the right side of the series of vertical lines are used. (See fig. 21.)

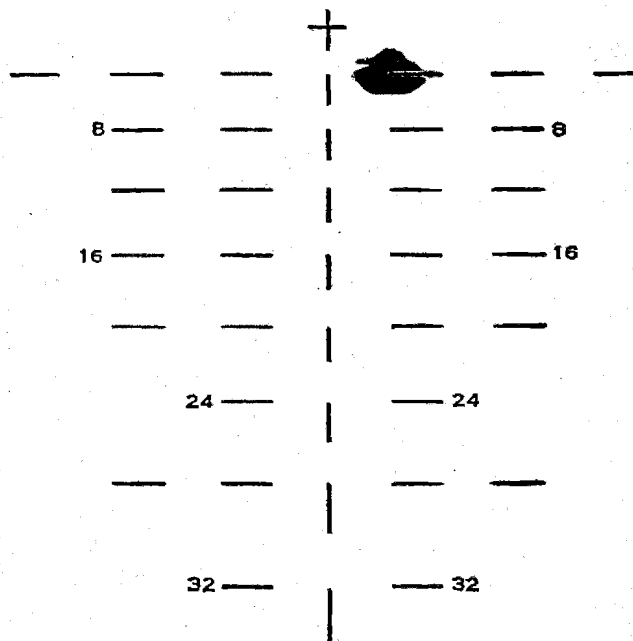


Figure 21. Aiming, M69C telescope. Target moving right to left, range 400 yards, one lead.

(2) Exercises require the gunner to lay appropriate lead markings on an aiming silhouette target. Stationary targets assumed to be moving right or left at a range of 400 yards should be used for these exercises.

c. Aiming for range and leads (fig. 22). (1) *Initial and subsequent laying.* Range and lead are combined automatically within the telescope by the series of horizontal lead lines extending from the right and left of center at 400-yard-range intervals. For targets requiring leads at ranges other than those etched on the telescope reticle, some interpolation is necessary. Select the appropriate range and lead points in the

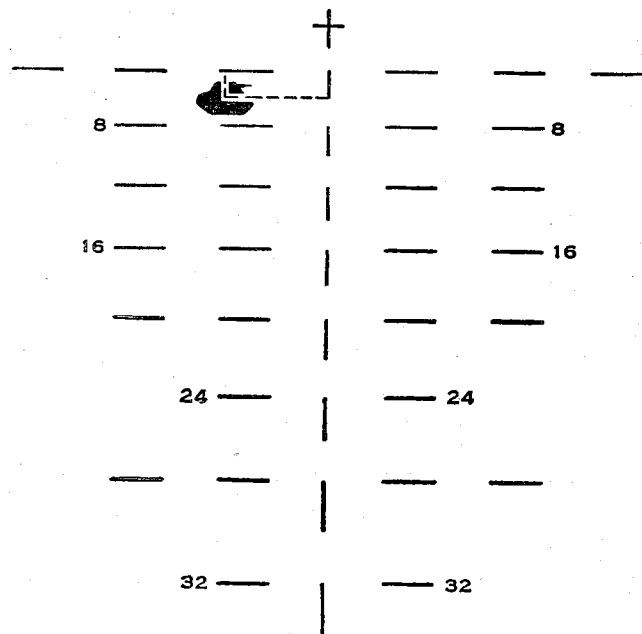


Figure 22. Aiming, M69C telescope. Target moving left to right, range 600 yards, two leads.

telescope reticle and project them to an imaginary point of intersection. This aiming point is laid on the center of the visible mass or center of the target.

(2) *Exercises.* Each squad member is required to lay the gun with different ranges and leads on a stationary aiming silhouette target, an assumed direction of movement being specified in each case. These should include exercises requiring the gunner to interpolate.

d. Exercises to develop speed in manipulation. This training will consist of that prescribed in paragraph 68e.

e. Use of the lighted reticle. At least one period of training will be devoted to use of the lighted reticle in order to accustom all men to laying the gun during hours of limited visibility. (See a, b, and c above.)

71. TRACKING AND SIMULATED FIRING. The gunner next learns how to track a moving target and simulate firing while maintaining the correct sight picture. To accomplish this, exercises are conducted on targets moving over a course designed to give practice in tracking and firing at targets which, as to speed and direction, approximate those that will be encountered in combat.

a. Procedure. These exercises should be conducted on the 1,000-inch range and the procedure corresponds as nearly as practicable to that followed when conducting 1,000-inch range firing. (See pars. 110 and 113.) By so doing, the squad undergoing instruction will receive early training in a systematic and orderly range procedure for efficient conduct of firing exercises. If a 1,000-inch range is not available these exercises can be conducted on the set-up shown in figure 17.

b. Equipment. The range equipment described in paragraphs 67 and 106 is necessary. Either targets similar to those used for the aiming exercises or the standard 1,000-inch range targets may be used. (See

pars. 107 and 108.) The set-up shown in figure 17 requires that all targets have the aiming silhouette targets on both sides.

c. Organization. If a 1,000-inch range is not available for tracking exercises, an organization of the platoon similar to that shown in figure 17 will be satisfactory. Duties should be assigned as follows for either plan.

(1) The *platoon leader* conducts instruction and supervises the work of the entire platoon.

(2) The *platoon sergeant* issues the orders for conducting the exercises and controls operation of the target by signal.

(3) The two *drum operators* operate the drum (or target sleds) so that the target will be exposed at a uniform speed for the time specified.

(4) The *squad leaders* conduct individual instruction and check execution of the exercises by the gunners.

(5) The *gunners* execute the exercises at the guns.

(6) The *loaders* assist in coaching as directed by the instructor or his assistants.

(7) The *remainder of the platoon* is held clear of the guns and arranged numerically, ready to move forward to the guns when directed.

d. Target speeds, 1,000-inch moving targets. (1) The approximate speeds at which 1,000-inch moving targets should move on a single run, to represent speeds at various ranges, are shown in the table below. The time of exposure of a target for a particular run may be determined by dividing 500 inches by the target speed shown in the table.

(2) Initially, in conducting the tracking exercises, the slower speeds should be used; as instruction progresses, the speeds used for successive runs of the target should be increased and varied.

(3) Prior to starting the tracking exercises, the instructor should explain how the range and targets on the 1,000-inch moving target range are operated

Target speeds in mph	Target speeds in inches per second corresponding to—			
	300 yards	600 yards	900 yards	1,200 yards
7½.....	12	6	4	3
10.....	16	8	5	4
15.....	24	12	8	6
20.....	33	16	11	8
30.....	49	24	16	12

and the speeds at which 1,000-inch targets should be run.

e. First exercise. (1) *Purpose.* The purpose of this exercise is to develop the gunner's skill in tracking and operating the firing mechanism, while engaging a target moving directly across the front of the gun and over comparatively level ground. Throughout the exercise, emphasis should be placed on the importance of smooth manipulation while fire is simulated.

(2) *Procedure.* (a) The exercise is conducted on the level course of the 1,000-inch moving target range. The target is a single tank target. The assistant instructor, the gunner executing the exercise, and a loader who acts as No. 2 when firing is simulated, or as coach when directed, take positions at each gun. When all are ready, the target is operated. No commands for loading are given. An example of the sequence of command is: ALL GUNS ON AIMING STAKE; when all guns have been laid on the aiming stake and are ready, the command is: LEFT FRONT, TANK, SEVEN (FOUR) HUNDRED, ZERO LEAD, TRACK.

(b) At the command LEFT FRONT, the gunner traverses to the left, and as the target comes into view

he aims the gun, using the announced lead on the center of the aiming silhouette and tracks the target. As soon as the target is obscured from view by the screen, and without further command, it is immediately set in motion in the opposite direction. As the target reappears, the gunner re-lays on the aiming silhouette and tracks, using the same range and lead, but conforming to the new direction of travel of the target.

(c) The passage of the target once across the course is known as a "run." A "double run" is a passage of the target once over the course in each direction. The exercise is continued until two double runs are completed, when the next order takes position. Frequent changes of gunners and coaches are advisable to avoid monotony.

(d) As soon as the gunner develops some degree of facility in tracking, he is required to simulate firing four or five rounds during each run of the target. To accomplish this, the order issued for the exercise is modified thus: ALL GUNS ON AIMING STAKE, SIMULATE FIRE, FIVE ROUNDS EACH RUN; then, when all are ready, LEFT FRONT, TANK, SEVEN (FOUR) HUNDRED, ZERO LEAD, COMMENCE FIRING. The gunner engages the aiming silhouettes as before and simulates fire by actuating the firing mechanism. After each firing operation, the loader, No. 2, simulates loading. The gunner disturbs his lay on the target as little as possible by the added operation of firing. The assistant instructor checks the gunner's tracking and firing operations; he must develop in the gunner an ability to track and manipulate the trip lever simultaneously. Accurate and continuous tracking while firing requires skill and coordination. Beginners have a tendency to cease tracking whenever they actuate the trip lever. This tendency can be overcome by careful instruction and practice.

(e) The exercise begins with the target operated

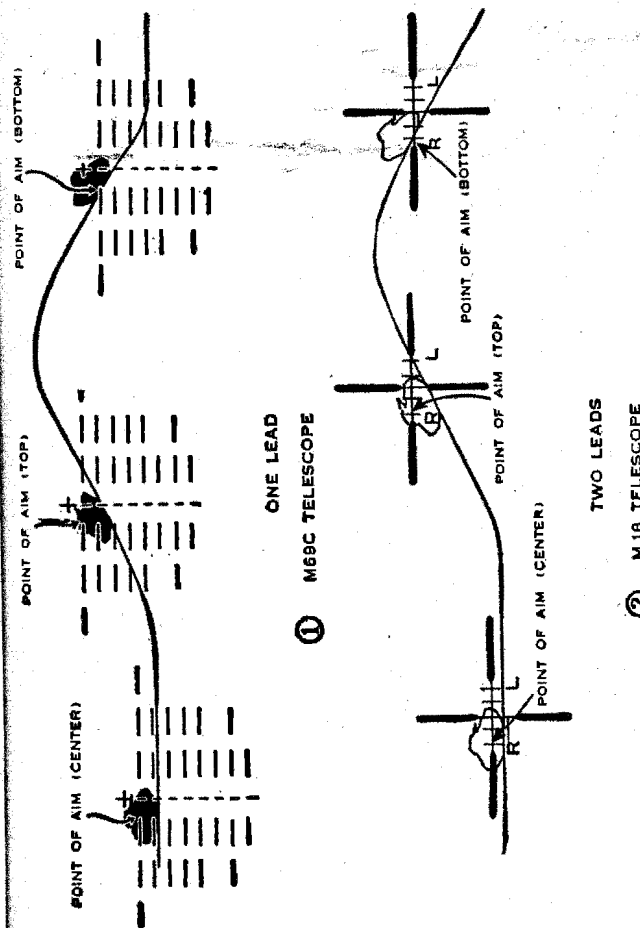


Figure 23. Changes in aiming. Target moving up and down hill, left to right.